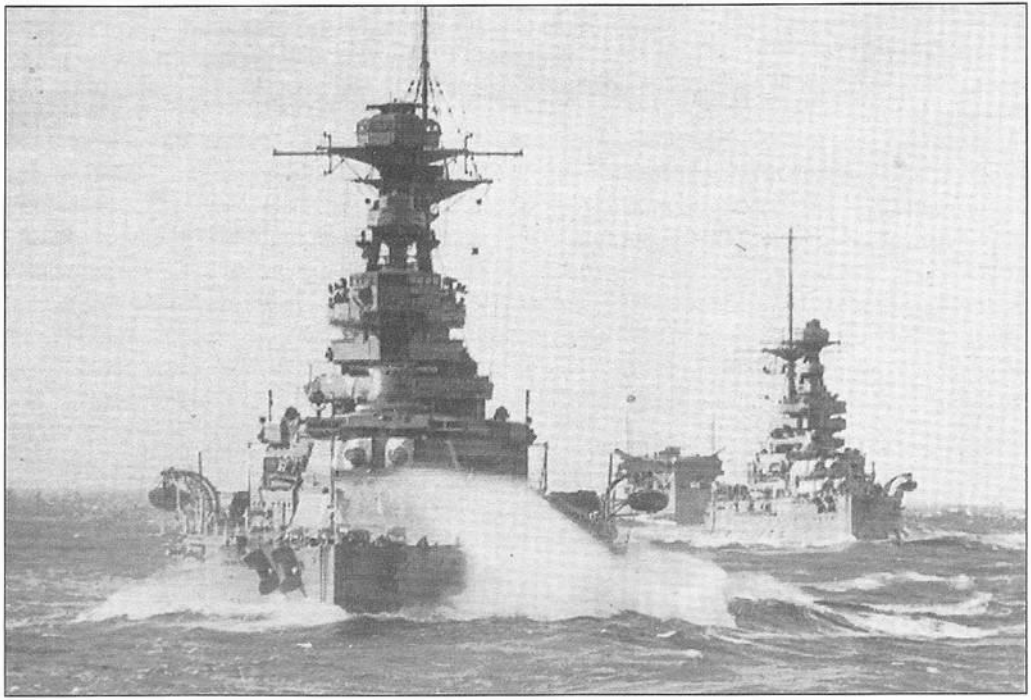
Great Naval Battles: North Atlantic 1939-43

User's Manual



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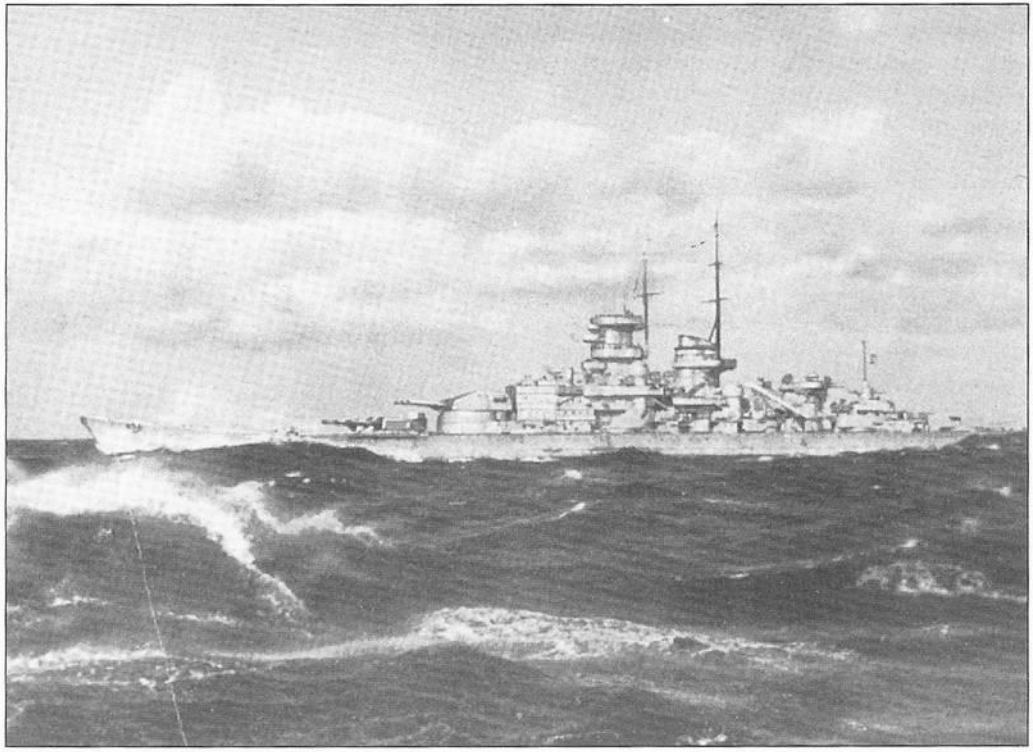
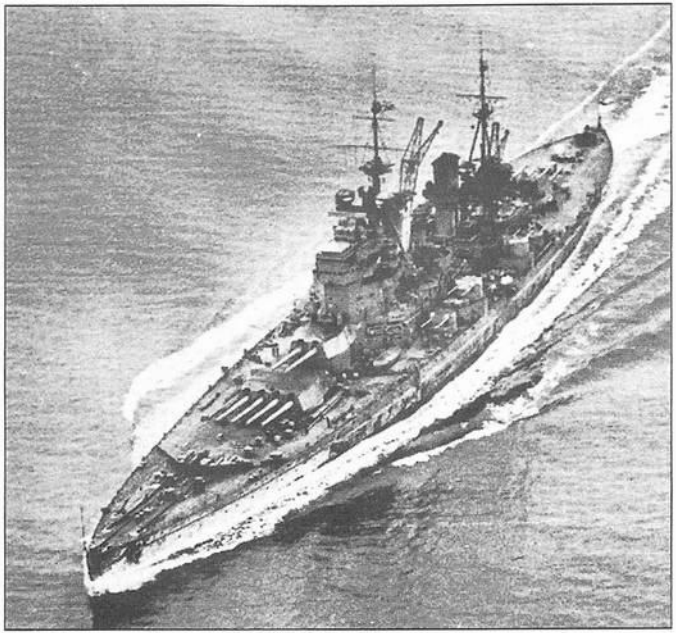
INTRODUCTION AND HISTORICAL BACKGROUND



Sea power! Imagine sleek grey warships slicing through white-capped swells, tongues of fire splitting the blackness of night, bomb-laden aircraft straining from a heaving flight deck. War at sea pits man's mightiest machines against each other, amid nature's rawest forces in a merciless contest for national survival. One wave can wash a man overboard unseen. One shell can send a thousand men to a watery grave. Battles are won and lost by a single action; wars can be won or lost in a single battle. Success means access to the world's resources, while failure means almost certain doom. Inexorable power, mechanical might, and elemental struggle: these are the images of naval warfare. These are the images of GREAT NAVAL BATTLES:™ NORTH ATLANTIC 1939-43.



Monarchs of the Sea: Modern battleships culminated centuries of maritime dominance by gun-armed ships.

England in particular has prospered from sea power. Its power at sea has protected it and provided it with resources. The ocean has been its lifeline and its highway to the world. It reached out across the sea to create history's greatest empire, and it reached out across the sea to maintain Europe's balance of power. Because it controlled the seas, it defeated Louis XIV, Napoleon, and Kaiser Wilhelm. So long as the Royal Navy controlled the sea, no enemy could touch it. So long as Britain remained inviolate, no conqueror on the Continent could be secure.

Hitler's rise to power represented the greatest challenge ever to the island's interests. To begin with, Britain's resources were at their lowest ebb since the country's rise to empire. Newer, greater industrial nations had emerged to overshadow its economy. The mortal stuggle of the First World War had drained it of wealth, manpower, and self-confidence. Rival imperialists in Italy and Japan, and the stirring nationalism of colonial subjects everywhere threatened its hold on its overseas empire. Britain, which had flowered during the latter part of the ninteenth century, now strained under the weight of that greatness, more burdened than helped by the legacy of that Golden Age.

Furthermore, Hitler was like no conqueror before him, a self-proclaimed enemy of humanistic values and Christianity, a force of evil unparallelled in European history. Controlling Europe's strongest nation, he threatened not just the political independence of Britain, and the survival of the humane traditions so slowly and painfully created over the course of centuries, but also the physical existence of whole races of people, the very lives of untold numbers of individuals. Under his rule millions of people were slaughtered outright, and many millions more consigned to a sub-human existence of slavery. If his navy could cut off Britain's maritime communications even for a few months, British resistance would be impossible, and an endless night would descend upon Western Civilization and the world.

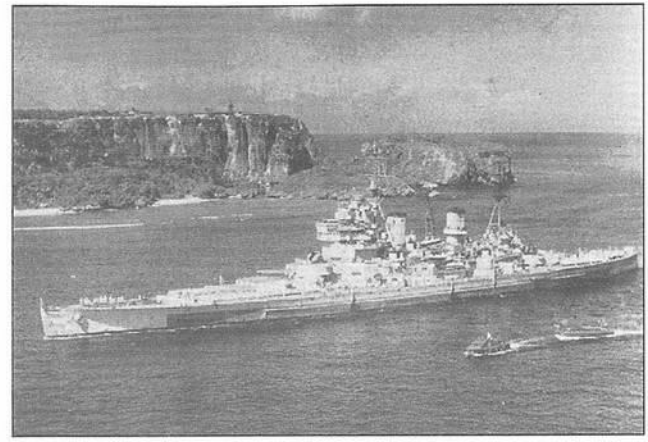
Britain did have one potential source of strength, however: it did not necessarily stand alone. Across the Atlantic, the slumbering giant of America was slowly awakening. If it could be brought into the fray, the Allies would have greater resources, and Germany could be stopped before it became too strong. With the Roosevelt administration anxious to get involved and the American public gradually becoming aroused by Axis aggression, it seemed probable that the United States would intervene eventually — but the question was whether it would be in time. If Britain fell, it was unlikely that America would ever be able to liberate occupied Europe. But if Britain could hold out long enough, it could serve as a base for American intervention, an unsinkable aircraft carrier, troopship, and merchantman anchored off the coast of France.

A battleship's forward turrets and secondary guns, ready for action.

Victory and defeat thus hinged on sea power. If Germany could deny Britain the use of the seas, it could deny the Western Allies victory. If Britain could maintain control just long enough, if it could make that final effort, the Allies would prevail. GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 lets you experience this critical struggle, lets you test your mettle in a contest where the outcome determines the fate of the world.

Overview: Surface Combat in the North Atlantic

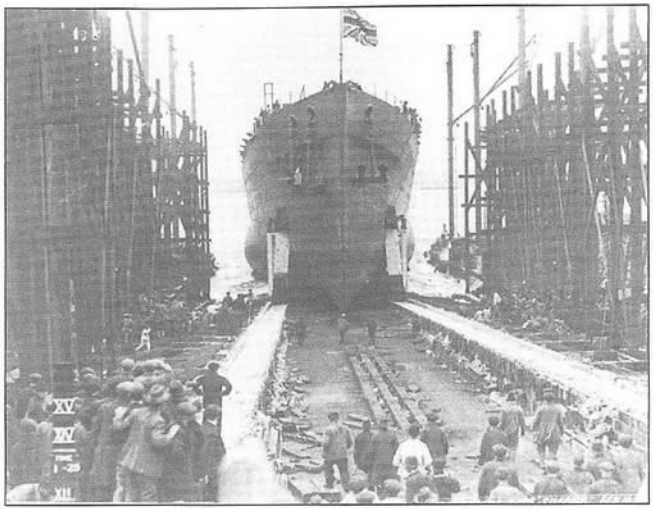
Some people claim that oil is the most critical resource in the modern world; others argue it is steel. The fact is, though, that shipping has played a more fundamental role than any inert substance in fueling economic development and strengthening political power. Long before factories churned out masses of products, long before railroads linked the seas, merchant ships plied the world's oceans, transporting bulk cargos from one continent to another, generating surplus capital, solidifying European hegemony, and favoring those European nations that could best tap into global trade. Great Britain in particular profited for centuries from maritime trade, and it used the wealth thus accumulated to simultaneously fund the economic transformation known as the Industrial Revolution, the long period of peace dubbed the *pax Britannica*, and the cultural flowering called the Victorian Age. By the end of the ninteenth century, the critical role of Britain's control of the seas was widely understood, and any nation that aspired to the status of world power in the twentieth century had to challenge it.



A King George V class battleship. The quadruple turrets were plagued by problems; often at least one of the four guns was out of action.

The Roots of Rivalry (1897-1918)

The Anglo-German naval struggle actually began in the 1890s, when the second generation of German rulers began seeking a "place in the sun" consonant with the young *Reich's* growing power. Blocked from continental expansion by the balance among the European Great Powers, Kaiser Wilhelm and his ministers saw an alternative in colonial empire. Inspired by the grand strategic theories of Alfred T. Mahan, who emphasized control of the world's sea lanes as the key to world power, influenced by the great industrialists who needed a growing market for Germany's burgeoning output of steel, and guided by Admiral Tirpitz (head of the Imperial Navy), Germany in 1897 embarked on an extensive shipbuilding program designed to transform it into one of the world's leading naval powers.

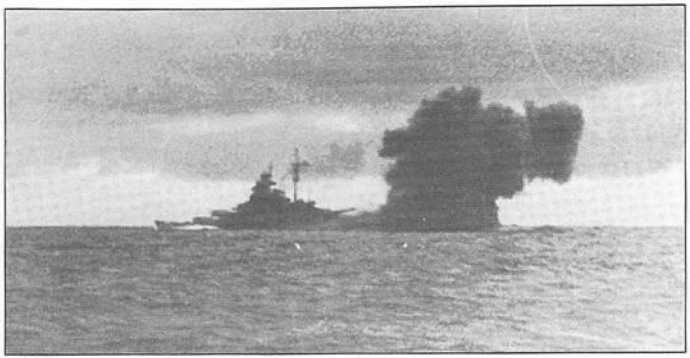


The H.M.S. Suffolk being launched on February 16, 1926. Warship construction played an important role in supporting England's heavy industry.

This German initiative posed a grave challenge to the existing maritime powers, especially Great Britain. An island nation that depended on maintaining a pre-eminent navy to safeguard its colonies, the sea lanes to them, and the home islands themselves, Great Britain had traditionally sought to maintain a fleet equal to the next two powers combined. By the turn of the century the rise of Japan and America made this policy impractical, but alliance with Japan and amity with America negated these threats, at least in the short run. The German navy, however, was a sword pointed directly at Britain's heart, and so Britain undertook its own all-out building program. However, with the balance of economic power tilting inexorably toward the *Reich*, Britain could only maintain superiority in the vital North Sea that lay between the two by withdrawing capital ships from the Mediterranean. It was only able to afford to do this by entering into an understanding with France, an understanding that was to draw the British onto the Continent when war broke out a few years later.

Despite Germany's global ambitions, its High Seas Fleet was designed for a short-range war. Tirpitz and his staff assumed that the British would attempt a close blockade of enemy ports, as it had done traditionally, and could therefore either be defeated in detail or, more likely, be drawn into a decisive battle under conditions of the Germans' choosing. Unfortunately for them, the British saw the danger of a close blockade and chose instead to blockade at a distance, patrolling the English Channel and the UK-Norway gap with cruisers and holding the Home Fleet in reserve. Instead of bringing a decisive battle on Germany's doorstep, a challenge to the blockade would have to take place on the far side of the North Sea, at the limit of the German ships' operating range and close to British bases. As a result, the two formidable fleets remained in a standoff for most of the war, a standoff that favored the British.

They were able to cut Germany off from all overseas trade, quite literally reducing the country to starvation, while Britain continued to import vital supplies of food and munitions from their Empire and America.



The Bismarck fires while maneuvering at high speed during the Battle of the Denmark Straits.

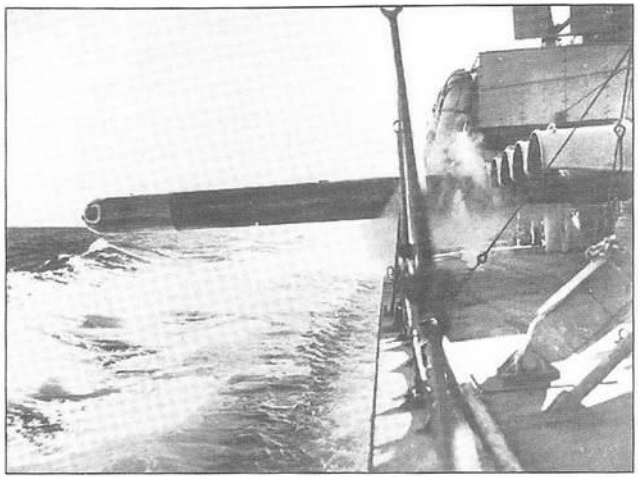
The High Seas fleet did make one attempt to challenge British control of the North Sea in 1916, but the resulting battle of Jutland simply confirmed the *status quo*. The superior German battleships gave somewhat better than they took, but when the battle was over they had to return to port, leaving the Royal Navy in control of the waves. The German battlefleet remained ineffectually "in being" for the last two years of the war, leaving it to the new submarine arm to besiege Britain through a new kind of blockade, almost bringing it to its knees and bringing the United States into the fray in the process. If the U-Boats were ultimately no more successful than the battleships, at least they avoided the ignominy of riding out the war at anchor. And the end of the High Seas Fleet added little to its luster; the sailors mutinied rather than sortie at the eleventh hour, sparking the collapse of the Imperial government, and the battleships themselves were scuttled by their own crews after the armistice.

Treaties and Tensions (1919-1939)

Despite the German battleships' ineffectiveness during the war, the British regarded them as no less of a threat than the German submarines. The Versailles Treaty allowed the Germans absolutely no U-boats and permitted them to keep only six obsolescent pre-dreadnoughts and a handful of smaller craft. It allowed them to replace the battleships as they got older, but the replacements could only displace 10,000 tons and carry 11" guns, ensuring that they would be inferior in both armor and armament to all allied battleships. The few cruisers permitted under the Treaty were similarly undersized, as were new destroyers and torpedo boats. The Treaty's ban on military aircraft included the navy, which was expressly prohibited from creating any aircraft carriers. The Allies explicitly intended that the German navy would never amount to more than a modest coastal force.

Having all but eliminated the German navy, the British proceeded to circumscribe their own fleet by signing the Washington Naval Treaty in 1922. This agreement sought to avoid an expensive naval arms race among the victors by establishing fixed ratios of capital ships and limiting their size and armament. The British accepted parity with the United States and less than twice the number of ships allowed Japan (a ratio of 5:5:3, with France and Italy getting 1.75 each). Furthermore, they accepted an upper limit of 35,000 tons on individual ships, a maximum gun caliber of 16", restrictions on how old ships had to be before replacement, and limits on how extensively older ships could be modernized. A similar treaty established analogous limits on cruisers in 1930. As a result of these agreements, the British built few new capital ships for more than a decade, they limited those that they did build to the dimensions set in 1922, and they similarly constrained their cruiser construction for half a decade.

While the British voluntarily limited their naval construction, even under the Weimar Republic in the 1920s the German *Reichsmarine* did everything in its power to circumvent the "shackles of Versailles." For instance, it arranged for Germany's top U-boat designers to work in a Dutch firm that it partially owned so they could stay current by helping develop submarines for foreign countries. Similarly, it arranged for prospective naval officers to learn to fly while still civilians, and it contracted for designs and prototypes of naval aircraft and aircraft communications systems. It negotiated for the building of fast banana freighters that could serve as auxiliary cruisers in the event of war, and, most impressive of all, it created the *Deutschland* class battleships to replace the old pre-dreadnoughts as they retired from service.



A torpedo being launched. These could be fired from a submarine or surface ship or dropped by an airplane.

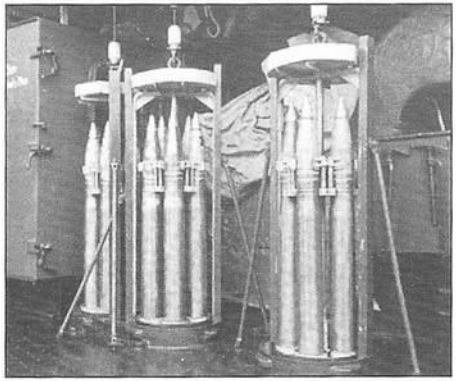
These ships — there were eventually three — were officially called *Panzerschiffen*, or "armored ships" and nicknamed "pocket battleships" by the British. They made a mockery of the Allies' desire to confine Germany to her coasts. Officially 10,000 tons,

they actually displaced over 11,000, carried six 11" guns, could make 28 knots, and had a range of 10,000 miles. Designed explicitly for commerce raiding, they could outrun anything they didn't outgun, and could outgun anything they couldn't outrun. The first vessel gave Germany effective control of the Baltic when it was launched in 1933, and its cruises soon showed that in the event of war the *Kriegsmarine* (as the navy was now called), would be a factor in the farther seas as well. To support it and its sisters, the *Etappendienst* renewed old contacts around the world, cultivating intelligence sources and preparing merchantmen for service as resupply vessels.

The French responded to the new threat with their *Dunkerque* class battlecruisers, but the British remained unperturbed since they had three battlecruisers of their own that were just as fast and much more powerful. They could not remain complacent, however, once Hitler repudiated the Versailles Treaty in March, 1935. Hoping to avoid another expensive naval race, they preferred to negotiate rather than build. The result was the Anglo-German Naval Treaty of 1935, which permitted the Germans to have up to 35% of the British surface fleet and 45% of its submarine force. From a trio of mini-battleships and a few light craft, the *Kriegsmarine* could expand to five battleships, five heavy cruisers, eleven light cruisers, two aircraft carriers, and sixty-four destroyers! And it could grow even bigger whenever the British added to their fleet.

And add to their fleet the British did, at least partly in response to the aggressive program of German building. In 1935 the Germans began two light battleships, the *Scharnhorst* and *Gneisenau*, which displaced 31,000 tons, sported nine 11" guns, could sail 9,000 miles, and were capable of up to 32 knots. They also began construction of two heavy cruisers. The next year they began a far more formidable ship, the

Bismarck, which weighed over 40,000 tons (although officially it conformed to the 35,000 ton Treaty limit), carried eight 15" guns, was superbly armored and compartmentalized, could steam 31 knots, and could range up to 8,000 miles. A sister ship, the *Tirpitz*, soon followed, and the British were clearly worried. They began to build a new class of five modern battleships, the *King George Vs*, their first new class in over a decade. These vessels displaced somewhat over 35,000 tons, carried ten 14" guns in two quadruple and one double turret, were well armored, and could steam up to 27 knots. The British also began construction of a modern aircraft carrier, the *Ark Royal*, and stepped up production of cruisers and destroyers as well.



These secondary gun shells combined bags of propellant with the warhead.

In late 1938, with the international situation heating up, the *Kriegsmarine* began planning for a second world war intended to transform Germany into a world power. While Hitler's focus was on the Eurasian "heartland," populated by the supposedly inferior Slavs and controlled by Nazism's Bolshevik arch-enemy, such a war would clearly involve Britain as well as France, and Germany would just as clearly be at a material disadvantage unless the navy could cut the Western Allies' Atlantic sealanes. After several stages of internal preparation, Admiral Raeder, the head of the navy, presented Hitler with two possible approaches.

One plan was quick and relatively cheap. It emphasized *Deutschland* class raiders, disguised merchant cruisers, and a massive force of submarines. In the event of war, these would swarm out into the Atlantic to strangle Allied commerce.

The other plan went to the opposite extreme, calling for a long term commitment of massive resources in an ambitious bid for naval supremacy. The three existing *Deutschlands*, a new class of twelve small battleships, disguised raiders, and a moderate force of submarines would be created to prey on Allied shipping. Meanwhile a fleet containing the *Bismarcks* and *Scharnhorsts* and two aircraft carriers would tie down the British Home Fleet. When, inevitably, these widely scattered threats compelled the British to spread their forces, two strike groups containing three new super-battleships and one aircraft carrier each would be waiting to sortie. If the British kept their fleet concentrated, they would lose their merchant marine; if they dispersed it to protect the sealanes, the warships would be defeated in detail. This "Z-plan," which Hitler chose, was a magnificent combination of the commerce-raiding, fleet-in-being, and decisive-battle strategies that had traditionally been regarded as incompatible. The only problem was that the fleet would not be ready until 1946.

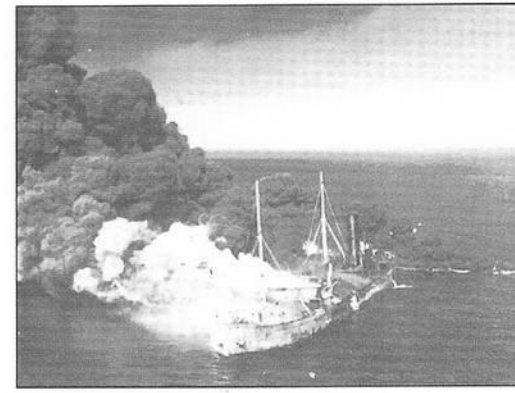
A British Leander class light cruiser, viewed from above.

Strategic Stopgaps (1939-1945)

Not surprisingly, Admiral Raeder was dismayed when war came less than a year later. "The surface forces," he commented gloomily, "can do no more than show that they know how to die gallantly." However, as a practical matter he could not afford to indulge such romantic fatalism, for the U-Boat arm, upon which the German naval effort would have to depend after all, deployed only 22 operational vessels, and would not be up to the required strength of 300 for at least two years. In the meantime, the surface fleet would have to help as best it could. Raeder adopted a "mini-Z-Plan" in which the three *Deutschlands* would raid the Atlantic sealanes while the *Scharnhorsts* kept at least part of the Royal Navy tied down at home. Destroyers would lay mines in British coastal waters, disguised raiders would slip out to harry distant commerce, and the two *Bismarcks* would join when they were ready. The goal was to destroy Allied shipping and, by disrupting schedules and forcing the adoption of large convoys, further reduce the effective tonnage available. The offensive was not going to bring Britain to its knees by itself, but it could soften it up until the U-Boats were ready to deliver the decisive blow.

War came too early for Britain as well. The British had only begun to rearm in earnest after the Czech crisis in 1938, and all the services were still frantically trying to modernize their equipment. Nevertheless, the Royal Navy enjoyed a comfortable margin of superiority over the Germans, with 14 battleships to two, six aircraft carriers to none, and ratios of six to one over the Germans in cruisers and nine to one in destroyers. Furthermore, the Royal Navy had a centuries-old tradition of naval supremacy and extensive ongoing experience with oceanic operations. The *Kriegsmarine*, in contrast, was the poor step-child of the German military, with less tradition than the army, less cachet than the *Luftwaffe*, and little opportunity to gain experience with oceanic operations. If the Royal Navy had only had the Germans to contend with, there would have been little cause for concern.

However, a world empire meant global commitments, and the British were overstretched trying to meet them all. In addition to controlling the North Sea and English Channel in order to safeguard the home islands and blockade Germany, the Royal Navy had to patrol the North and South Atlantic sea lanes, maintain communications through the Mediterranean in the face of restive Italy, and secure Imperial positions in the Indian Ocean and the Far East against the Japanese. It was all, in fact, well beyond Great Britain's resources, and by just how much began to be clear within the first months of the confict. Two of the three German pocket battleships sortied in the last weeks of peace and hid out during the first weeks of the war. Upon Hitler's signal in late September, the *Deutschland* began patrolling in the North Atlantic while the *Graf Spee* began operations below the equator. The former scored only a few successes before returning to port, but the latter enjoyed a spectacular voyage in the South Atlantic and Indian Oceans, sinking over 50,000 tons of merchant shipping and tying down almost half the British and a significant portion of the French fleets. Significantly, the raider was intercepted, damaged, and forced to scuttle off Montevideo by British cruisers, but the Admiralty's satisfaction at that success was tempered by the knowledge of how much of the Royal Navy's resources it had taken.



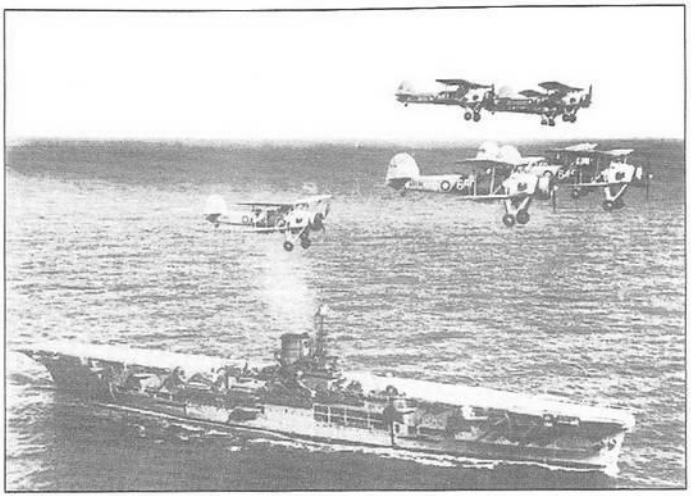
The objects of all the sound and fury afloat were the creaky, rusty old tubs of the world's merchant fleets.

Aside from a few short German sorties that resulted only in the sinking of the British auxiliary cruiser *Rawalpindi,* there was little action involving the major surface units during the first winter. In April, however, the *Kriegsmarine* spearheaded a sudden German thrust into Scandinavia. The move was inspired partly by 1) fear that the British were about to interdict the route of vital Swedish iron ore through neutral Norwegian waters (which, in fact, they were); partly by 2) the entreaties of the Norwegian fascist leader Vidkun Quisling; and partly by 3) the writings of retired Admiral Wolfgang Wegener. He had criticized Tirpitz's strategy in the First World War of seeking decisive battle in the North Sea, and argued that in the next war Germany should strike at Britain's lines of communication from bases beyond the exits to the North Atlantic. On April 9th, 1940, all available German warships transported three German divisions to Norwegian ports stretching from Oslo to Narvik, supported by airborne landings and an overland invasion of Denmark. The invasion force ran into British vessels laying mines in Norwegian waters as well as scattered resistance by Norwegian coastal defenses, but all the landings succeeded. The greatest resistance was encountered in Oslo, where the heavy cruiser *Blucher* was sunk, and Narvik, where nine German destroyers were lost and an Anglo-French expeditionary force was landed and fought on for a month. While the Germans ultimately secured control of all of Norway, the price for the navy had been high; in addition to the losses mentioned, another heavy cruiser, a pocket battleship, and the *Gneisenau* suffered significant damage; two light cruisers went down; and virtually every other ship needed some repair. The Germans did sink several destroyers and an aircraft carrier, but the British could take the losses in stride while the *Kriegsmarine* could not.

Ironically, the success in Norway was soon overshadowed by a far greater success in France. In a lightning campaign lasting from mid-May to mid-June, the *Wehrmacht* defeated the main French and British armies, compelling the French to surrender and the British to evacuate the remnants of their expeditionary force across the beaches of Dunkirk. The wounded *Kriegsmarine* played little part in the campaign, but was a major beneficiary of the swift victory, for it was able to begin operating U-Boats out of French ports beyond the English Channel by the end of July. Furthermore, the campaign removed one powerful fleet from Allied control, the French, and added another to the German side, the Italian. While the Royal Navy reluctantly destroyed the bulk of the French navy to prevent it from falling into German hands, the Italian entrance into the fray opened a new theater in the Mediterranean. As 1940 began, Germany was an all-but-landlocked, secondary naval power; by the end of the summer it could strike at British sealanes from the Adriatic to the Norwegian Sea.

A British carrier in port. Weather conditions and proximity to land limited carriers' roles in the North Atlantic.

Since the still formidable power of the Royal Navy blocked a direct invasion of the British Isles, at least until the *Luftwaffe* could establish complete control of the air, the *Kriegsmarine* prepared itself for the decisive phase of its ongoing campaign against Britain's maritime communications. The Battle of Britain, the air assault against British airpower, industries, and cities, was preceded, accompanied, and followed by the Battle of the Atlantic, a siege by sea. Germany's surface forces formed an integral part of this campaign along with air, surface, and sub-delivered mines, U-Boats, disguised raiders, and air strikes against ships and port facilities. If these succeeded, Britain would be forced to its knees; if not, its access to the world's resources would ultimately enable it to overwhelm Germany's continental empire.

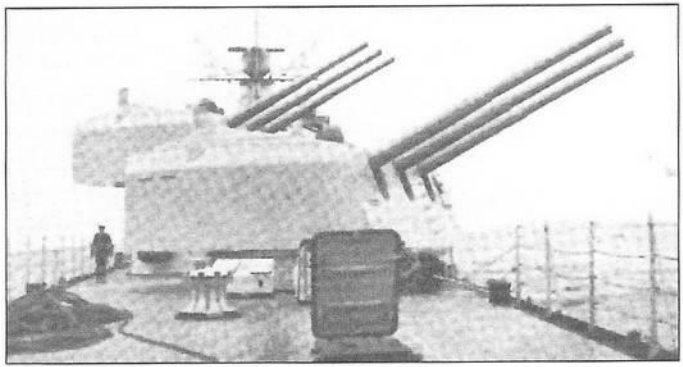


The British aircraft carrier Ark Royal with Swordfish torpedo planes overhead.

In November, 1940, the third pocket battleship, the *Admiral Scheer* embarked on the war's most successful sortie, a five month voyage in which it cruised the South Atlantic and Indian Oceans and sank about 100,000 tons of merchant shipping single-handedly. A month later the heavy cruiser *Hipper* made an unsuccessful sortie, but after putting into the French naval base at Brest it sortied briefly again in March, 1941, and hit the jackpot, sinking seven freighters. Meanwhile, the *Scharnhorst* and *Gneisenau* sailed together in January, 1941, and not only sank over twenty ships totalling about 115,000 tons, but also threw the entire convoy system into turmoil, diverting precious British battleships to the dreary duty of escorting convoys. By the beginning of April, the two battleships had put into Brest, while the *Hipper* and *Scheer* returned to German waters. The Winter Sorties marked a high point for the German navy, and the imminent arrival of the battleship *Bismarck* and the heavy cruiser *Prinz Eugen* appeared to portend yet greater triumphs.

Fortunately for the British, this was not to be, despite the *Bismarck's* stunning victory over the *Hood* in the Denmark Straits between Iceland and Greenland at the beginning of its first sortie in early May. The aroused Royal Navy marshalled all available forces against the powerful raider, including the new battleships *King George V* and *Prince of Wales*, the older battleships *Rodney* and *Ramillies*, the battlecruisers *Renown* and *Repulse*, the aircraft carriers *Illustrious* and *Ark Royal*, and a host of cruisers, destroyers, and submarines. Damaged in the battle with the *Hood*, the *Bismarck* sought the safety of Brest, but was crippled by an airstrike on May 26th and sunk on the following day. The loss of the *Hood* was more than avenged, for the Germans' surface forces had made their last incursion into the Atlantic shipping lanes.

That this would be so was not apparent in June of 1941, however. Despite the loss of the *Bismarck*, the *Kriegsmarine* still had the two smaller battleships in Brest, and they were joined by the *Prinz Eugen*, which had sortied along with the *Bismarck*. Together, these vessels should have posed a formidable threat to Britain's communications, a threat that was made real through periodic voyages. That they did not was thanks to Hitler, the Royal Navy, the RAF, and the USA. Hitler reacted to the loss of his magnificient new ship by placing severe restrictions on the operations of surface ships, and as oil supplies dwindled he began to cut back on their fuel allotments as well. The Royal Navy tracked down and destroyed the small fleet of oilers that had hidden in the ocean's vastness to replenish the supplies of the marauding raiders. The RAF bombed Brest incessantly and despite innumerable misses, managed to do just enough damage to keep the three ships out of action for the entire summer and fall. By the time all three were more or less fit to sail, the Japanese attack at Pearl Harbor had brought America into the war, and the addition of the United States' Atlantic squadron into the surface equation more than counterbalanced the loss of the *Prince of Wales* and the *Repulse* to Japanese air-



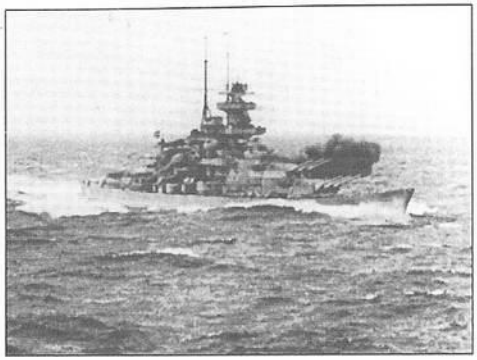
The rear turrets of a German light cruiser. Six of nine guns were located aft because the ship was expected to be overhauling merchantmen or fleeing from warships.

craft off Malaysia. Any further sorties would be suicidal. Consequently, in February of 1942, the *Scharnhorst, Gneisenau,* and *Prinz Eugen* made an audacious dash up the English Channel back to Germany, arriving with only minor damage and the satisfaction of having tweaked the nose of the startled British lion.

The "Channel Dash" confirmed the end of the *Kriegsmarine's* surface actions in the Atlantic. The surface forces continued to contribute to the German war effort, but they were limited to the freezing waters off of northern Norway. Here, far from the British bases and close to their own, they could help protect Scandinavia from a possible invasion while preying on the Allied convoys that carried vital goods to Russia via Murmansk and Archangel. An idea of the magnitude of their contribution is conveyed by the contents of just one small, 14 vessel convoy: 202 tanks, 2,046 other vehicles, 87 fighters, 33 bombers, 11,500 tons of fuel oil, 12,650 tons of aviation spirits, and 54,321 tons of other supplies. The Allies hoped to run several of these convoys every month. With the titanic struggle on the Eastern Front reaching its decisive phase, the fate of every merchantman on the Murmansk run clearly had an impact on the outcome of the war. The *Tirpitz* went directly to Norway after it came into service in late '41, where it was joined by the *Hipper,* the two surviving pocket battleships, and eventually the *Scharnhorst* as well. Several light cruisers and a number of powerful destroyers rounded out the surface fleet, which was supported by powerful air and submarine forces as well.

The German strategy was to use the major warships to overwhelm a convoy's escorts or, better yet, force the convoy to scatter. Either way, the undefended merchant ships would then be easy prey for the destroyers, aircraft, and submarines as well as the big ships' guns. Restrictions imposed by fuel supplies, limited intelligence, and Hitler's caution meant that convoys were subjected to attacks mainly by U-Boats, aircraft, and destroyers, and only on occasion by heavy units. In particular, in early July 1942,

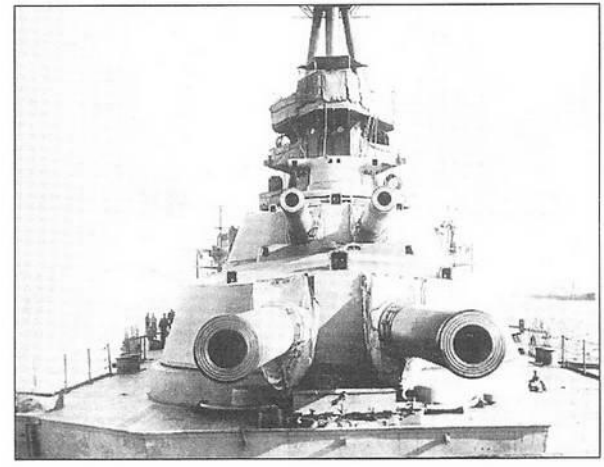
convoy PQ-17 scattered in the face of a sortie by the *Tirpitz* and suffered such severe losses that the British suspended the Murmansk run for the following two months. This action marked the high point of the *Kriegsmarine* in Arctic waters, and showed the potential of combined air, undersea, and surface operations.



The Gneisenau fires its port side secondary guns at the destroyer Ardent.

A heavily escorted convoy carrying critical war materials did fight its way through air and submarine attacks in September while suffering substantial, though not crippling, losses. Thereafter, operations elsewhere precluded further Murmansk convoys for some months, and when they resumed, conditions were radically different. In contrast to the perpetual daylight of the Arctic summer that enabled the *Luftwaffe* to attack repeatedly, the perpetual darkness and stormy weather of the Arctic winter made the air arm ineffective. Submarines, too, had trouble operating effectively in these conditions, and Raeder thought that this meant a chance to demonstrate the value of the surface fleet. In the last days of December, the *Hipper*, the *Lutzow* (actually the rechristened *Deutschland*), and six destroyers sortied against convoy JW-52B. Amidst snow squalls in the grey half-light, the *Hipper* engaged the escorting destroyers repeatedly, gradually knocking them out, but in the confusion the *Lutzow* missed its opportunity to ravage the undefended convoy. The timely arrival of the cruisers *Sheffield* and *Jamaica* saved the convoy, for they appeared just as the raiders moved in for the kill, sinking one German destroyer, damaging the *Hipper*, and driving the Germans away.

The Battle of the Barents Sea, as the engagement was known, proved to be the last significant engagement of the *Kriegsmarine's* surface forces. Hitler, enraged by the failure, decided to break the remaining ships up so the guns could be mounted in coastal bunkers, and replaced Raeder with Donitz, the commander of the U-Boat fleet. Donitz initially favored dismantling the surface vessels as well, but upon reflection realized both their value in tieing down Allied forces and the cost of breaking them up. He persuaded Hitler to let some remain, in particular the *Scharnhorst* and the *Tirpitz*. The *Scharnhorst* went down in a final, futile sortie against a Murmansk convoy in December, 1943, defeated not only by an overwhelming force of escorts, but also by advances in naval technology, particularly radar, that had left the Germans far behind. The *Tirpitz* led a furtive existence among the Norwegian fjords, harried by British bombers, commandos, and subs, existing only to tie down Allied resources and threaten any move on Norway. Repeatedly damaged, the *Tirpitz* was finally sunk by heavy bombers on November 12, 1944.



The 15" guns of an older British battleship. Slow and obsolescent, these vessels still packed a wallop.

Conclusions

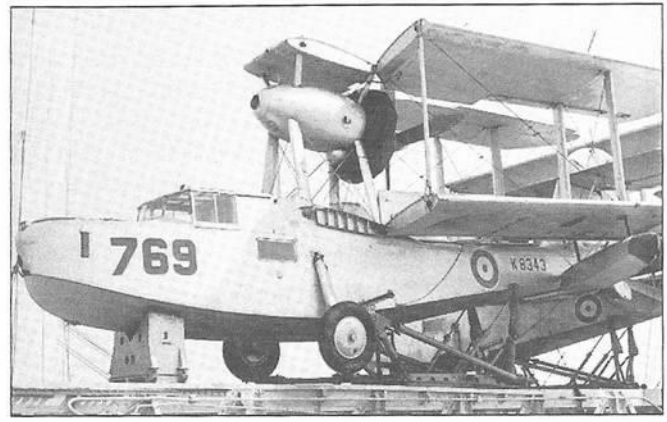
In one sense, the fate of the *Tirpitz* epitomized the fate of the German surface fleet in general. Conceived in a grandiose dream of global conquest, it was doomed by Hitler's impatience at the time and cost, and his fundamental incomprehension of naval strategy. Having invested huge resources to create the big ships, he refused to risk them in the actions that would have justified their existence. Consequently, they spent far more time in port or drydock than on the high seas. And when they did venture out they found the British too numerous and too skillful to achieve more than limited success.

Yet from another point of view, the German surface forces achieved a commendable record. Heavily outnumbered, they took on the world's foremost navy and gave as good as they got. For the first two years of the war, they filled in manfully in the war against British communications, until the U-Boat fleet, which was far better suited for this campaign, could take over. They then moved to another theater where they could make a contribution, and fought on against ever greater odds. Defeat is never pretty, and the *Kriegsmarine's* surface units were guilty on occasion of poor coordination and excessive caution, but on balance they had acquitted themselves honorably.

On the British side, the naval war was the final vindication of the maritime empire. The battlefleet played a vital role in preserving the last bulwark of civilization against the floodtide of Nazi conquest. If not for the officers, bluejackets, battleships, and carriers of the Royal Navy, the *Kriegsmarine* might well have enabled Hitler to bring Britain to its knees, either by direct assault or by steady siege. In either case, without a base in Britain, the American struggle to liberate Europe would have been far more difficult, if not entirely impossible. The second world conflict, coming so soon after the first, required the last reserves of the British Empire; if it left it exhausted, the exertion had been well worth the effort.

BRIEFINGS

The foregoing "Surface Combat in the North Atlantic" section gives an overview of the Atlantic Campaign, but there is much of the history that cannot be included in such a summary. Therefore, GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 contains an on-line history section with short discussions of specific aspects of the war at sea.



A British Walrus float plane. The reconnaissance potential of aircraft was perceived early, and between the wars most battleships and cruisers were fitted with them.

ACCESS

Access to the on-line histories is very simple. From any screen, use the controller to activate the menu bar, select the BRIEFINGS pull-down menu title, and then the menu item. The selected item corresponds to a subject category, and calls out a dialog box from which you can choose the entry covering the exact topic you want to read. For instance, selecting the VESSELS item brings up a dialog box containing all the entries in this category, from which you can select the entry on BATTLESHIPS, or the one on CRUISERS/BATTLECRUISERS. Specifics on how to control the menu bar and dialog box are included in "The Menu Bar" on page 98.

Categories and Topics

Each heading below corresponds to an item on the BRIEFINGS menu, and constitutes one of the categories of information included in the database. Each item in the list under a heading is the title of an individual entry, and is selected via the dialog box called out when you select a category.

SYSTEMS

- *Main Armament*
- *Secondary and Antiaircraft Armament*
- *Torpedoes*
- *Rangefinders*
- *Fire Control and Directors*
- *Gun Turrets*
- *Armor*
- *Propulsion*
- *Electronics*

VESSELS

- *Battleships*
- *Cruisers and Battlecruisers*
- *Destroyers*
- *Aircraft Carriers*
- *Submarines*
- *Aircraft*

Sailors tending a ship's engines.

OPERATIONS
- *Tactics*
- *Bases*
- *Shipping Lanes*
- *Strategies*
- *Naval Intelligence*
- *Related Operations*

BACKGROUND
- *The Navies*
- *Supreme Commanders*
- *The Admiralties*
- *Warship Construction*
- *Naval Treaties*
- *The US Role*

ENGAGEMENTS
- *The* ***Deutschland*** *and the* ***Graf Spee***
- *The Invasion of Norway*
- *The Winter Sorties*
- *Operation* ***Rheinubung***
- *The Battle of the Barents Sea*
- *Death of the* ***Tirpitz***

A British Nelson-class battleship. The unusual arrangement of turrets was employed to achieve maximum firepower while staying within treaty weight limits.

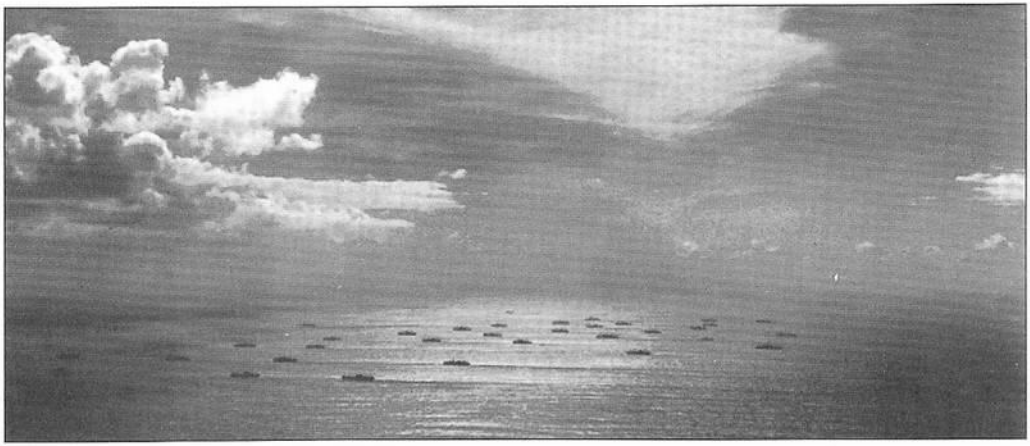
SCENARIOS

GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 contains three types of scenarios you can play: engagements, operations, and the campaign game.

• *Engagement scenarios* are brief tactical actions in which you control a small number of ships in a specific combat.

• *Operation scenarios* are larger games in which you control a significant number of surface units over a considerable period of time.

• The *Campaign scenario* lets you run the entire surface war in the Atlantic during the first half of World War II, from the outbreak in the fall of 1939 until the middle of 1943.



Convoys of merchantmen carried the vital troops, supplies, and raw materials that kept Britain alive during its darkest hour.

Tactical Engagements

These scenarios are short, sharp battles between a small number of ships in a limited expanse of ocean. You can run them from the flag bridge, but you cannot move up to the level of the Admiralty. Because they are the most basic level of play, we suggest that you start with them rather than jumping into the operations or campaign. Moreover, we suggest that you start with the first one and then move on to the second, as they are designed to introduce you to the game system gradually. After that, you can probably manage any that you want to, although you should keep in mind that they are arranged roughly in order of complexity.

Gunnery Practice

Time: 8 am, May 24, 1941

Place: South of the Denmark Straits, in the North Atlantic Ocean

German: The battleship *Bismarck*

British: The battleship *Prince of Wales*

Situation: After sinking the *Hood* in the Denmark Straits, the *Bismarck* was shadowed by the *Prince of Wales* and two cruisers. In this hypothetical scenario, the German ship has emerged from a fogbank at the same time as the British battleship, which is sailing on a parallel course. Each is just as surprised as the other, and the cruisers are nowhere in sight. There is no room for subtlety or maneuvering; like scorpions in a bottle, the two ships will have to fight it out until only one survives. This situation gives the new player a chance to practice firing at a moving target while experiencing what it's like when the target fires back!

Agility vs. Power

Time: 3:30 pm, March 16, 1941

Place: West of Newfoundland, in the North Atlantic Ocean

German: The battleship *Gneisenau*

British: The battleship *Rodney*

Situation: After a long, arduous voyage of over one and a half winter months, on March 15 the *Scharnhorst* and the *Gneisenau* have finally struck paydirt. An unescorted convoy in their path has dispersed, and for two days the German raiders have picked off panicked merchantmen as they desperately try to steam out of harm's way. But on the 16th, as it rescues the survivors from its latest victim, the *Gneisenau* is surprised by the battleship *Rodney*. The tables are turned! The German must use his speed and maneuverability to defeat this more powerful enemy; the Briton must rely on his heavier weaponry and armor to make up for his slower speed.

The Scharnhorst steams through choppy seas. Teamed with her sister-ship Gneisenau, the pair made a formidable hunting force.

Pocket Battleship Sighted!

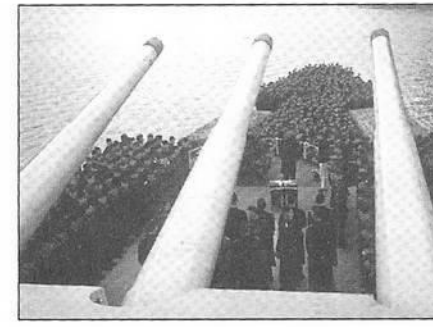
Time: 6:14 am, December 13, 1939

Place: The mouth of the River Platt, west of Montevideo, Uruguay

German: The pocket battleship *Graf Spee*

British: Force G: The cruisers *Exeter, Ajax,* and *Achilles*

Situation: So far, the voyage of the *Graf Spee* has been spectacularly successful; the raider has sunk or captured 50,000 tons of merchant shipping, and kept half the Royal Navy busy trying to track it down. Now, the captain of the *Graf Spee,* Hans Langsdorff, has decided to try for one more merchantman off the River Platt before turning toward home. However, Commodore Harry Harwood, commander of the British Force G, anticipated this move and stationed his three cruisers there. As the sun rises on December 13, 1939, the *Graf Spee* has sighted three topmasts along the horizon. Thinking they are a light cruiser and two destroyers guarding a convoy, the German has rapidly closed. By the time Langsdorff realizes his miscalculation, it is too late. Far from a final easy kill, the *Graf Spee* is locked in a fight for survival. Victory will certainly enhance an already spectacular voyage, but failure will far outweigh all the previous success.



The crew of a pocket battleship assembled at the stern. Above them are the three 11" guns of the aft turret; on either side are the torpedo tubes.

The Clash of Titans

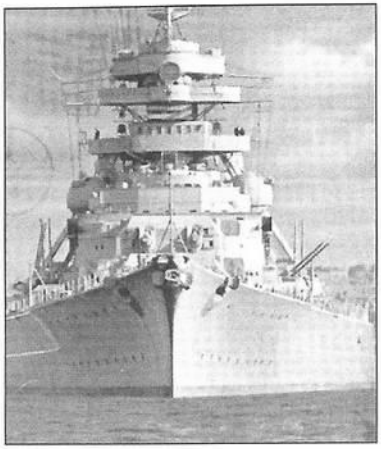
Time: 5:45 am, May 24, 1941

Place: The Denmark Straits, between Iceland and Greenland

German: The battleship *Bismarck* and the heavy cruiser *Prinz Eugen*

British: The battlecruiser *Hood* and the battleship *Prince of Wales*

Situation: On May 23, the Germans' mighty new battleship *Bismarck* and their newest heavy cruiser, the *Prinz Eugen*, attempted to sneak through the Denmark Straits between Iceland and Greenland in order to raid the Atlantic sealanes. However, the cruisers *Norfolk* and *Suffolk* spotted and shadowed them, and alerted their backups, the venerable battlecruiser *Hood* and the modern battleship *Prince of Wales*. Early the next morning, the British battle forces have intercepted the two German raiders, and the ensuing battle pits the Germans' newest and most powerful warships against the pride of the Royal Navy. Each side has to win, and has to win big. The battle is more than a strategic contest, it is a test of national superiority. If the British win, it will prove that while beaten on land and assaulted from the air, Britannia still rules the waves. If the Germans win, it will signify to many that the sun has finally set on the British Empire.



The Bismarck from dead ahead. It is easy to see why the Germans placed such high hopes in her.

Arctic Cruiser Action

Time: 11:30 am, December 31, 1942

Place: Northeast of the North Cape, in the Barents Sea

German: The heavy cruiser *Hipper* and the destroyers *Beitzen(Z4)* and *Eckholdt(Z16)*

British: Force R: the cruisers *Sheffield* and *Jamaica*

Situation: In the early hours of the last day of December, 1942, a powerful German force has moved into position to intercept a Russia-bound convoy, laden with vital supplies from the Western Allies for the Eastern Front. The heavy cruiser *Hipper* and several destroyers have maneuvered to the convoy's north, with the mission of attacking to draw off the escort so that the pocket battleship *Lutzow* and three other destroyers can move in for the kill from the south.

For several hours the *Hipper* has alternately lunged toward and retreated from the convoy, destroying three of its escorts and succeeding in drawing the rest away. But just as the German cruiser is about to finish them off, the convoy's covering cruiser force, the *Sheffield* and *Jamaica*, have rushed in from the opposite direction, taking the German ship under fire before it was even aware of their presence. Their appearance has transformed the battle; the hunter has become the hunted, the moment of triumph has become a struggle for survival.

The heavy cruiser Admiral Hipper is very similar in appearance to a battleship.

Davids vs. Goliath

Time: 10:50 am, December 31, 1942

Place: Northeast of the North Cape, in the Barents Sea

German: The pocket battleship *Lutzow*

British: The destroyers *Onslow, Obdurate,* and *Obedient*

Situation: On December 31, 1942, the cruiser *Hipper* and several destroyers are attacking Russia-bound convoy JW-51B. Their purpose is not actually to sink the ships, but instead to draw off the convoy's escort, luring it to the north so the pocket battleship *Lutzow* and three destroyers can move in for the kill from the south. The plan has worked perfectly so far. The *Hipper* has destroyed three escorts and diverted the rest, while the *Lutzow* has steamed across the unprotected convoy's path about three miles ahead of the lead ship. All the Germans have to do is turn westward, and the convoy will be at their mercy. The pocket battleship has lost contact with its destroyers, but the only possible help for the merchantmen is three battered British destroyers off to the north. Can they get there in time? And if they do, will it make any difference?

The breach of a naval gun. Within seconds, a shell thrust here could wreak havoc twenty miles away.

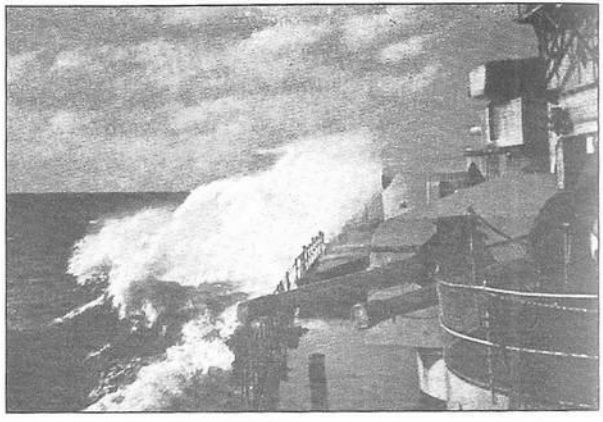
Battlecruisers in Action

Time: 3:30 am, April 9, 1940

Place: The mouth of the Vestfiord, southwest of Narvik, Norway

German: The battleships *Scharnhorst* and *Gneisenau*

British: The battlecruiser *Renown* and the destroyers *Hasty, Hereward, Hero, Hunter,* and *Hyperion*



A German ship in heavy seas. The North Atlantic is one of the roughest oceans in the world, hard on both the ships and the men who sail them.

Situation: Early in the morning of April 9, 1940, the British battlecruiser *Renown* is sailing toward Norway's Vestfiord, to support British destroyers that are laying mines there to disrupt the flow of Swedish iron ore through neutral Norwegian waters to Germany. At the very same time, the battleships *Scharnhorst* and *Gneisenau* (which the British class as battlecruisers) are steaming northwest, to support ten destroyers that are carrying an invasion force to the Norwegian port of Narvik, in order to help secure the flow of Swedish iron ore through Norwegian waters to Germany. At 3:30 am, amidst a furious gale, the three dreadnoughts have happened upon each other. Each side has a chance to win a notable success, but each side also runs the risk of suffering a serious setback.

Operation June

Time: 5:15 pm, June 8, 1940

Place: West of Narvik, in the Norwegian Sea

German: The battleships *Scharnhorst* and *Gneisenau*

British: The aircraft carrier *Glorious* and the destroyers *Ardent* and *Acasta*

The Scharnhorst fires a salvo from its forward guns at the aircraft carrier Glorious off Norway on June 8, 1940. An hour later, the carrier went down.

Situation: With France collapsing, the British and French have decided to withdraw their expeditionary force still resisting the German invasion of Norway in Narvik. The German navy, seizing the opportunity, has sent the *Scharnhorst, Gneisenau,* and *Hipper* out hunting on "Operation June." On the morning of June 8th, the *Hipper* has had to turn back to refuel, but the two battleships have gone on alone. Late that afternoon, their efforts are rewarded. At 4:45 pm they spot a thin trail of smoke off the starboard bow; at 5:10 it is identified as belonging to an aircraft carrier. At 5:15 the captain of the carrier, the *Glorious* (which is crowded with land-based aircraft being evacuated back to England) realizes that he is being stalked. He must either clear the flight deck and turn into the wind, toward the Germans, or make a run for it. Meanwhile, the pursuing ships are closing in like hungry wolves.

Jutland II

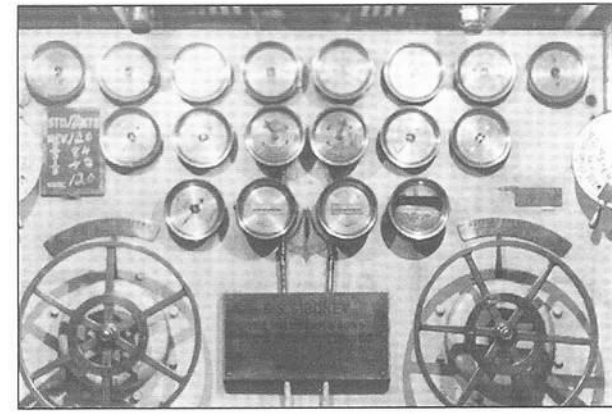
Time: 12:00 pm, October 24, 1941

Place: The mid-Atlantic Ocean off the Western Approaches to the British Isles

German: Every ship possible

British: Every ship available

Situation: This hypothetical scenario represents a maximum effort by the surface elements of the *Kriegsmarine*. In it, two powerful task forces have broken out simultaneously, hoping to destroy a significant portion of the Royal Navy. One has sailed around the north of Scotland through the Denmark Straits to a position off the Western Approaches to the British Isles. The other has sailed from Brest to meet the first. Together, they represent a formidable challenge to British sea power, and so the British have been concentrating their forces from all over the Atlantic for a decisive confrontation. Now the two sides are drawing together, each converging from several directions. Each confronts a divided enemy, but each is divided itself. But it is far too late for either to turn back. The war itself hangs on the outcome of this battle; the stakes are: control of the Atlantic Ocean, the survival of England, mastery of the European continent, and a place of leadership in the postwar world!



A few of the many controls needed to operate a World War II era warship.

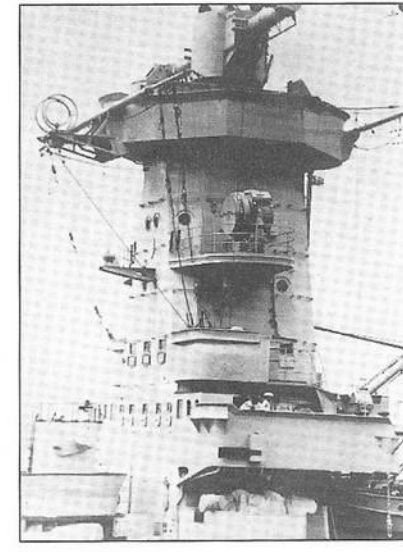
Operations

The following three intermediate length scenarios give you a chance to manage surface actions on an operational as well as a tactical level, controlling the movements of ships and task forces over the course of days and even months. They thus present a far wider range of challenges and activities than the tactical scenarios, activities that are similar to those in the campaign game, but without requiring anywhere near the same amount of time. Consequently, we suggest that you play these operations before you attempt the larger game. Furthermore, while the operations are presented chronologically, you probably should play them in the reverse order, since the "Barents Sea" is the shortest and simplest, while the "Winter Sorties" are the longest and most complex.

A convoy. Merchantmen found safety in numbers from U-boats and aircraft, but they had to scatter whenever a surface raider threatened!

The Winter Sorties

Introduction: After the invasion of Norway in April, 1940, virtually every surviving surface unit of the *Kriegsmarine* was damaged to some degree. As a consequence, they did not embark on any major operations until late in the year, waiting instead until their strength was restored. Their patience was to be rewarded during the winter, however. The pocket battleship *Scheer* started off on the offensive by breaking out of the Denmark Strait on November 1st, beginning a voyage to the South Atlantic and Indian Oceans that disrupted allied maritime activity throughout the winter. The heavy cruiser *Hipper* followed in December, and while it found slim pickings on this sortie, it ended up in Brest, well situated to sortie again. Meanwhile, the *Scharnhorst* and *Gneisenau* moved into the Norwegian Sea, waiting for an opportunity to sweep southward. With three major ships poised to enter the North Atlantic at the beginning of February, and the *Scheer* due to move through in March, the Germans can look forward to a time of unprecedented opportunity, and the British to a period of unprecedented problems.

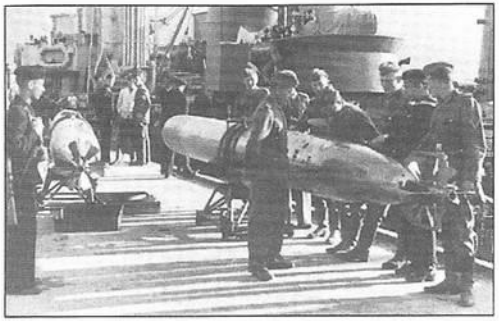


The Admiral Scheer's open bridge and armored conning tower.

Start Date: February 1, 1941

End Date: March 31, 1941

Operation *Rheinubung*



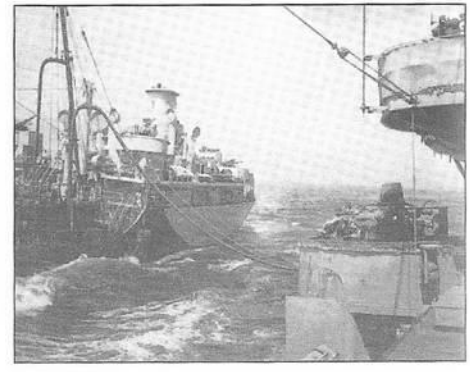
German Type GVIIaT1 torpedoes.

Introduction: The winter sorties by the *Scheer, Hipper, Scharnhorst,* and *Gneisenau* proved wildly successful, racking up 28 merchantmen totaling almost 250,000 tons and sending Allied shipping and naval operations into chaos. The biggest disappointment of the whole operation was the British use of battleships to escort convoys. Even the old "R" and *Queen Elizabeth* class vessels carried 15" guns, which could easily send a raider back to port for months of repairs if they didn't sink it outright, so their presence deterred attacks on the tempting convoys. However, that situation is about to change, for the mighty battleship *Bismarck* is ready for action, and it can easily draw off or dispatch the older battleships with the convoys, leaving the smaller escorts and merchantmen to the other raiders. Even now, the *Prinz Eugen,* Germany's latest heavy cruiser, is ready to sail with the *Bismarck.* Unfortunately, neither of the battleships that put into Brest at the end of their voyage is in shape to join them, but the opportunity for the new warship is too attractive to wait. If the new raiders can break out into the Atlantic, they may cause so much disruption to Britain's supply lines that the balance of the war tips decisively in Germany's favor. For the Germans, this is a moment of great opportunity; for the British, it is one of critical danger.

Start Date: May 22, 1941

End Date: June 22, 1941

Battle of the Barents Sea



An oiler refuels a warship. The Germans depended on such mid-ocean refueling to keep their raiders under way.

Introduction: The survival of Russia was vital for the Allied cause, and Allied aid was vital for Russian survival. The most direct route was around the North Cape of Norway to Murmansk and Archangel, but it was also the most dangerous. In the summer of 1942, as the Russian campaign entered its decisive phase, a threatened attack by the *Tirpitz* and other surface units forced Convoy PQ-17 to scatter, enabling U-Boats and aircraft to sink so many undefended merchantmen that the summer convoys were suspended for two months. As winter sets in, however, the long arctic nights ground the *Luftwaffe*, while the storm-tossed seas hamper operations by U-Boats. The surface fleet, however, can still threaten the convoys; if a strong sortie can ravage a convoy, perhaps this vital artery supplying the Russian armies at Stalingrad will be severed once again. Convoy JW-51B, which sailed on December 22, provides just such an opportunity, for the *Lutzow*, the *Hipper*, and six destroyers lie in wait, ready to sail upon notice of its approach. On December 30, the alarm is sounded at the German base in the Altenfjord. Meanwhile, the 13 merchantmen and nine escorts sail on, alert but as yet unaware of the danger lurking to the south.

Start Date: December 30, 1942

End Date: January 1, 1943

Campaign

The Western Alliance depends on control of the sea. In particular, it depends on control of the North Atlantic Ocean. Across this ocean come the prodigious quantities of food, materials, and munitions needed to sustain the British and their allies and enable them to fight. Furthermore, across this sea will come the American G.I.s needed to defeat Germany. Should Allied control of the sea be broken, Britain will collapse, and the liberation of Europe will be almost impossible.

Germany need not actually control the seas to defeat Britain, it needs only to deny Britain control of the seas. And it need not cut England off entirely in order to prevail; it needs only to disrupt the flow of ships enough to make the build-up for a cross-channel invasion impractical. The longer D-Day is delayed, the harder it will be to gain a foothold. Germany may be able to turn the tide against Russia, may be able to gain a separate peace, and, at the very least, every month the Western Allies are delayed means that much more of Europe that will eventually fall under Soviet domination. The British certainly have much to lose from the *Kriegsmarine's* success, and the Germans have a great deal to gain.

The Campaign scenario of Great Naval Battles: North Atlantic 1939-43 puts you in command of either the British or the German surface forces during the critical first four years of the war. The scenario starts in October, 1939, when Hitler released the *Deutschland* and the *Graf Spee* to begin raiding, and it lasts until September, 1943. During this time, you will be in control of all major warships of your fleet, ordering patrols and sorties, juggling repair and refit schedules, striving to maintain control of the sea if you command the British, or disrupt it if you take the Germans. At the end, your success will be measured by the impact surface operations have on the timing of D-Day, the cross-channel attack to liberate Europe. If the British do well, D-Day will be accelerated; if the Germans do better, it will be delayed or even aborted.

REFERENCE

FORM

Class: General type, usually the name of the first vessel commissioned. Note that minor variations usually exist between vessels in the same class; all statistics here are for the first ship unless otherwise indicated.

Vessels[Date]: Individual ships within class and dates of completion.

Displacement: Standard measurement of ship's weight in tons.

Length: Length of ship at waterline in feet.

Max. Speed: Maximum speed in knots.

Range: Distance (in nautical miles) the ship can travel at given speed in knots and return to port.

Main Armament[Turrets]: The number and bore diameter of the largest guns in inches, and the turret disposition of the guns. For example, [4x2] = four turrets, each with two guns.

Secondary Armament[Turrets]: The number and bore diameter of next largest guns, and the turret disposition of the guns.[1]

Torpedoes[Turrets]: The number of tubes and diameter of torpedo in inches, and the turret disposition of the torpedo tubes.

[1] No 4in. or smaller guns are listed unless they are the main armament of the ship.

Armor Belt: The maximum thickness of the side armor in inches.[2]

Armor Deck: The maximum thickness of the horizontal armor in inches.[2]

Armor Main Guns: The maximum thickness of the armor on the main turrets in inches.[2]

Armor Secondary Guns: The maximum thickness of the armor on the secondary turrets in inches.[2]

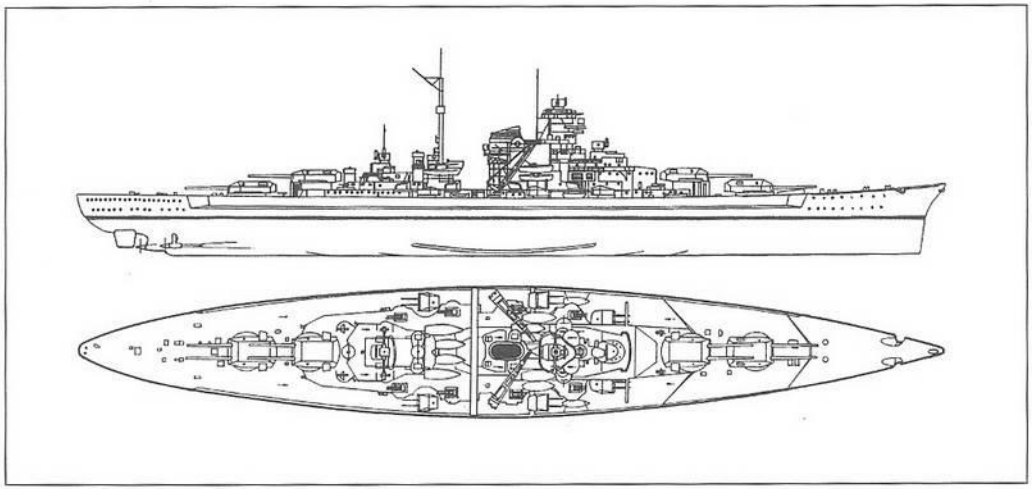
Armor Conning Tower: The maximum thickness of the armor on the conning tower in inches.[2]

Catapults: The number of catapults available for launching aircraft.

Aircraft: The number of aircraft carried.

[2] A listing of **none** indicates that the ship has either no armor, or armor of one inch or less.

Bismarck Class



Vessels [Date]: Bismarck [1940], Tirpitz [1941]

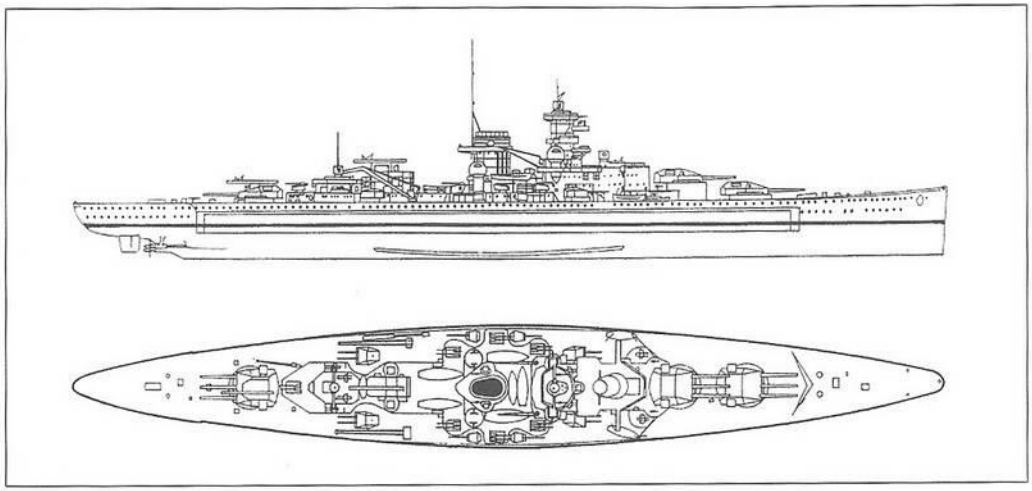
Displacement: 41,700 tons (42,900 tons Tirpitz)
Length: 792ft. 4in.

Max. Speed: 30kts.
Range: 8,000nm/18kts.
Main Armament: 8 - 15in./47 [4x2]
Secondary Armament: 12 - 5.9in./55 [6x2]
Torpedoes: none (6 - 21in. [2x3] Tirpitz)

Armor Belt: 12.5in.
Armor Deck: 6.75in.
Armor Main Guns: 14.25in.
Armor Secondary Guns: 4in.
Armor Conning Tower: 14in.

Catapults: 1
Aircraft: 4 - 6

Scharnhorst Class



Vessels[Date]: Scharnhorst [1938], Gneisenau [1938]

Displacement: 34,841 tons
Length: 770ft. 8in.

Max. Speed: 32kts.
Range: 9,000nm/18kts.

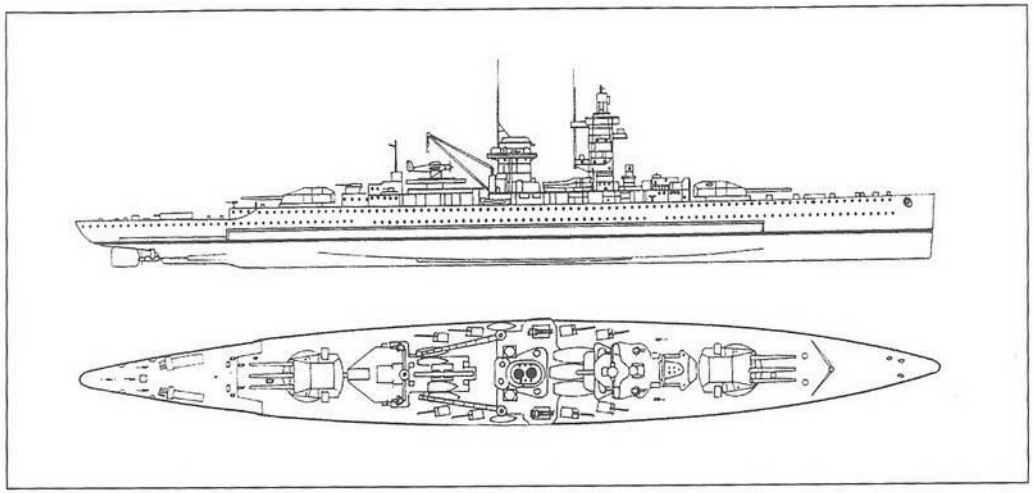
Main Armament: 9 - 11in./54.5 [3x3]
Secondary Armament: 12 - 5.9in./55 [4x2,4x1]
Torpedoes: 6 - 21in. [2x3] (none Gneisenau)

Armor Belt: 13.75in.
Armor Deck: 5in.
Armor Main Guns: 14in.
Armor Secondary Guns: 5.5in.
Armor Conning Tower: 13.75in.

Catapults: 1
Aircraft: 3 - 4

German Pocket Battleships

Deutschland Class



Vessels[Date]: Deutschland/Lutzow [1933, renamed 1939], Admiral Scheer [1934], Admiral Graf Spee [1936]

Displacement: 11,700 tons
(12,000 tons Scheer and Graf Spee)
Length: 596ft. 1in.

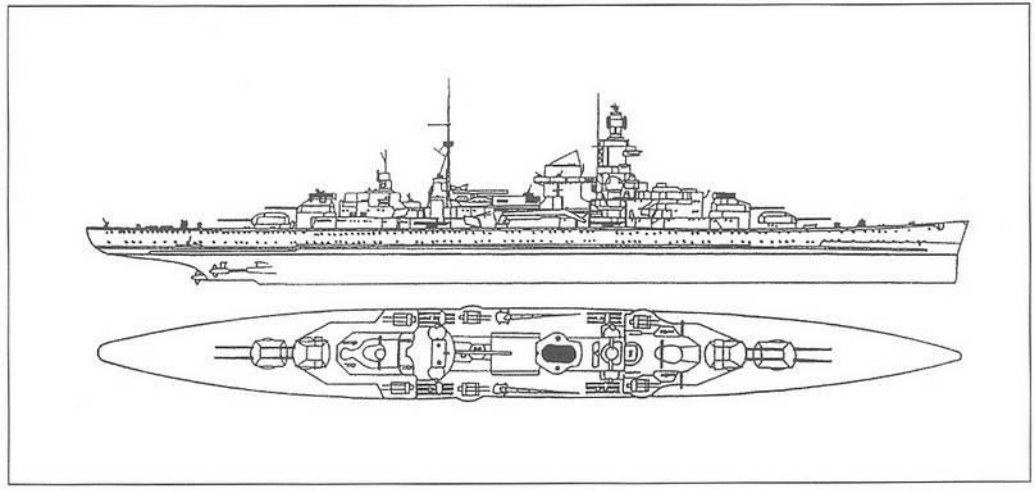
Max. Speed: 28kts.
Range: 10,000nm/18kts. (9,000nm/18kts. Scheer and Graf Spee)

Main Armament: 6 - 11in./54.5 [2x3]
Secondary Armament: 8 - 5.9in./55 [8x1]
Torpedoes: 8 - 21in. [2x4]

Armor Belt: 3in. (4in. Scheer and Graf Spee)
Armor Deck: 3in.
Armor Main Guns: 5.5in.
Armor Secondary Guns: 2.25in.
Armor Conning Tower: 6in.

Catapults: 1
Aircraft: 2

Hipper Class



Vessels[Date]: Admiral Hipper [1939], Blucher [1939], Prinz Eugen [1940]

Displacement: 14,050 tons (16,974 tons Prinz Eugen)

Length: 638ft. 5in. (654ft. 6in. Prinz Eugen)

Max. Speed: 33kts.
Range: 6,800nm/18kts. (5.500nm/18kts. Prinz Eugen)

Main Armament: 8 - 8in./60 [4x2]
Secondary Armament: 12 - 4.1in./65 [6x2]
Torpedoes: 12 - 21in. [4x3]

Armor Belt: 3.25in.
Armor Deck: 3.25in.
Armor Main Guns: 6.25in.
Armor Secondary Guns: none
Armor Conning Tower: 6in.

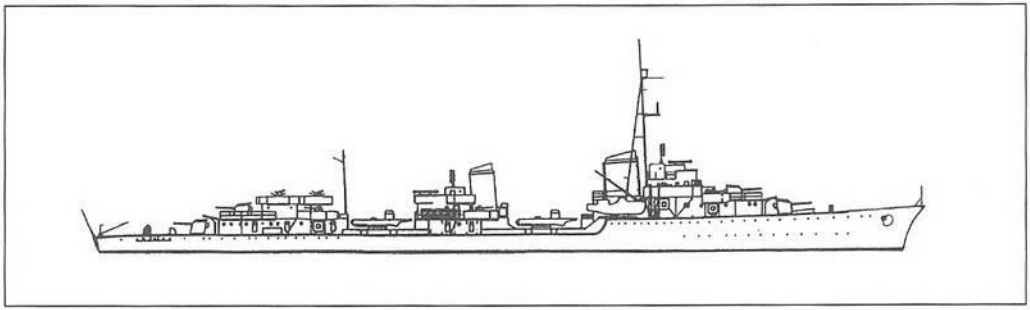
Catapults: 1
Aircraft: 3

German Light Cruisers

The Germans had a small number of light (6in. gun) cruisers, but these were not designed for, or used for, operations in the Atlantic.

German Destroyers

Z Class



Vessels[Date]: Z1 - Z22 [1937-39]

Displacement: 1,625 tons - 1,811 tons
Length: 381ft. 6in. - 393ft. 8in.

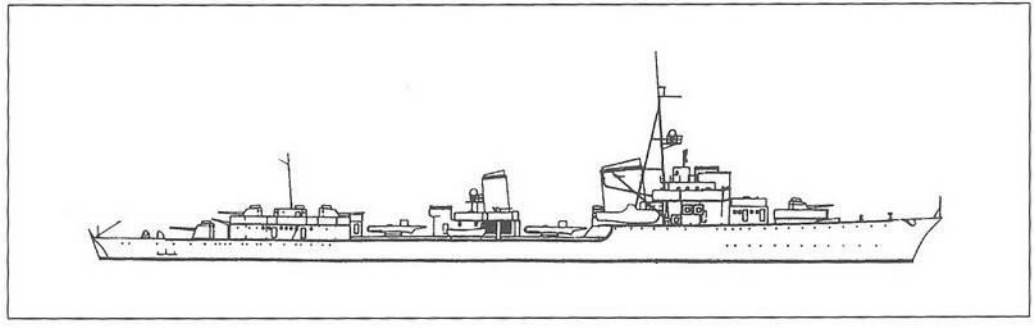
Max. Speed: 38kts. - 40kts.
Range: 4,400nm - 5,100nm/18kts.

Main Armament: 5 - 5in./45 [5x1]
Secondary Armament: none
Torpedoes: 8 - 21in. [2x4]

Armor Belt: none
Armor Deck: none
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: none

Improved Z Class



Vessels[Date]: Z23 - Z30 [1940-41]

Displacement: 3,605 tons
Length: 399ft. 11in.

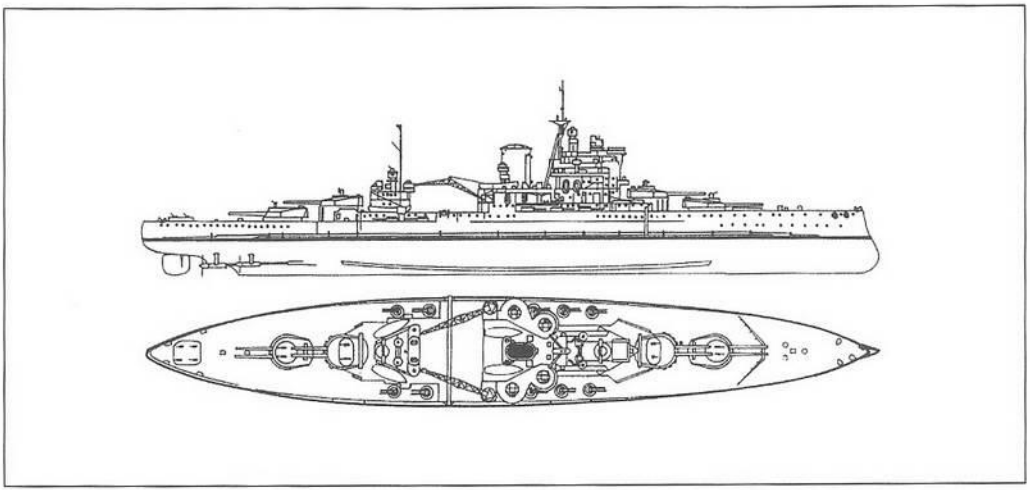
Max. Speed: 39kts.
Range: 5,900nm/18kts.

Main Armament: 4 - 5.9in./50 [4x1]
Secondary Armament: none
Torpedoes: 8 - 21in. [2x4]

Armor Belt: none
Armor Deck: none
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: none

Queen Elizabeth Class



Vessels[Date]: Queen Elizabeth [1915], Barham [1915], Malaya [1916], Warspite [1916], Valiant [1916]

Displacement: 31,795 tons
Length: 600ft.

Max. Speed: 24kts. (23kts. Warspite)
Range: 8,500nm/12kts.

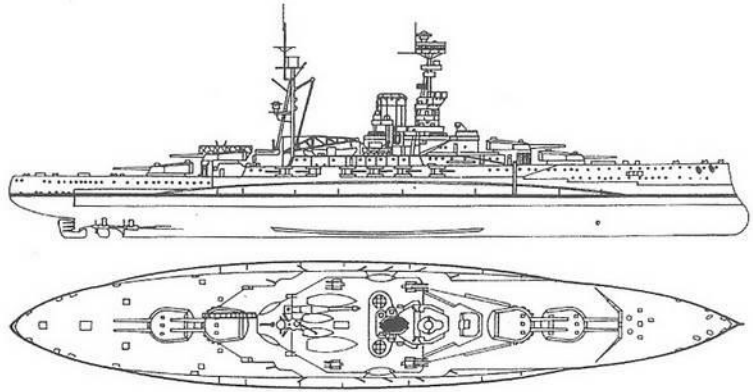
Main Armament: 8 - 15in./42 [4x2]
Secondary Armament: 20 - 4.5in./45 [10x2] (8 - 6in./45/XII [8x1 casemate] Warspite; 12 - 6in./45/XII [12x1 casemate] Barham and Malaya)

Torpedoes: none

Armor Belt: 13in.
Armor Deck: 5in.
Armor Main Guns: 13in.
Armor Secondary Guns: 2in. (6in. Warspite, Barham, and Malaya)
Armor Conning Tower: 3in. (11in. Barham; 5in. Malaya)

Catapults: 1
Aircraft: 2

Royal Sovereign Class



Vessels[Date]: Royal Sovereign [1916], Revenge [1916], Resolution [1916], Royal Oak [1916], Ramillies [1917]

Displacement: 29,950 tons
Length: 620ft. 8in.

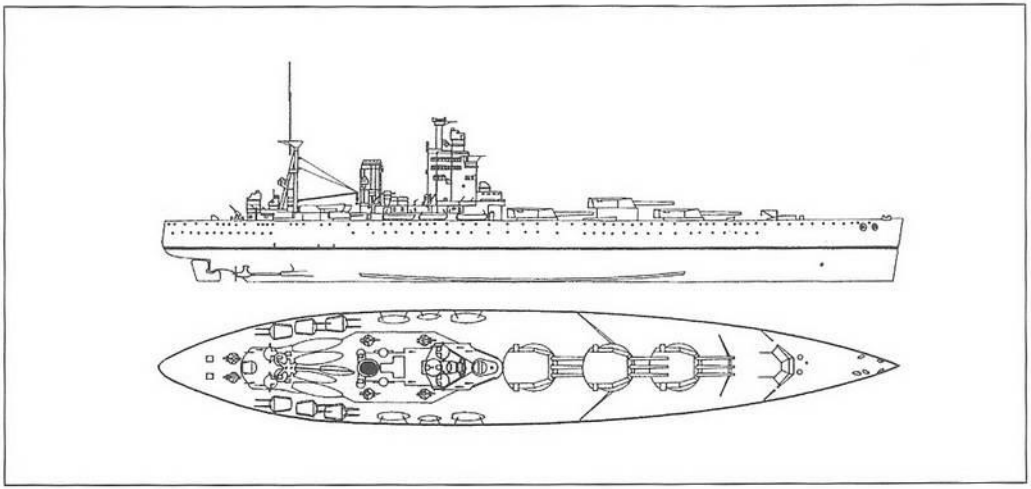
Max. Speed: 22kts.
Range: 8,600nm/13kts.

Main Armament: 8 - 15in./42 [4x2]
Secondary Armament: 12 - 6in./45/XII [12x1 casemate]
Torpedoes: none (4 - 21in. [fixed] Royal Oak)

Armor Belt: 13in.
Armor Deck: 3in. (4in. Royal Oak)
Armor Main Guns: 13in.
Armor Secondary Guns: 6in.
Armor Conning Tower: 11in.

Catapults: none (1 Royal Oak and Resolution)
Aircraft: none (2 Royal Oak and Resolution)

Nelson Class



Vessels[Date]: Nelson [1927], Rodney [1927]

Displacement: 33,313 tons (33,730 tons Rodney)
Length: 660ft.

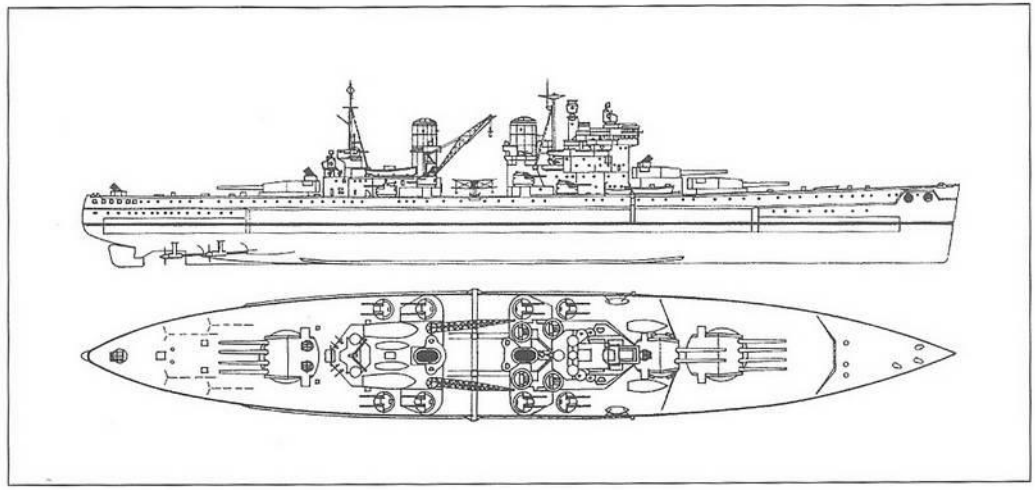
Max. Speed: 23kts.
Range: 7,000nm/14kts.

Main Armament: 9 - 16in./45 [3x3]
Secondary Armament: 12 - 6in./50/XXII [6x2]
Torpedoes: 2 - 24.5in. [fixed/underwater]

Armor Belt: 14in.
Armor Deck: 6.25in.
Armor Main Guns: 16in.
Armor Secondary Guns: 7.25in.
Armor Conning Tower: 14in.

Catapults: 1
Aircraft: 2

King George V Class



Vessels[Date]: King George V [1940], Prince of Wales [1941], Duke of York [1941], Howe [1942], Anson [1942]

Displacement: 36,727 tons
Length: 700ft.

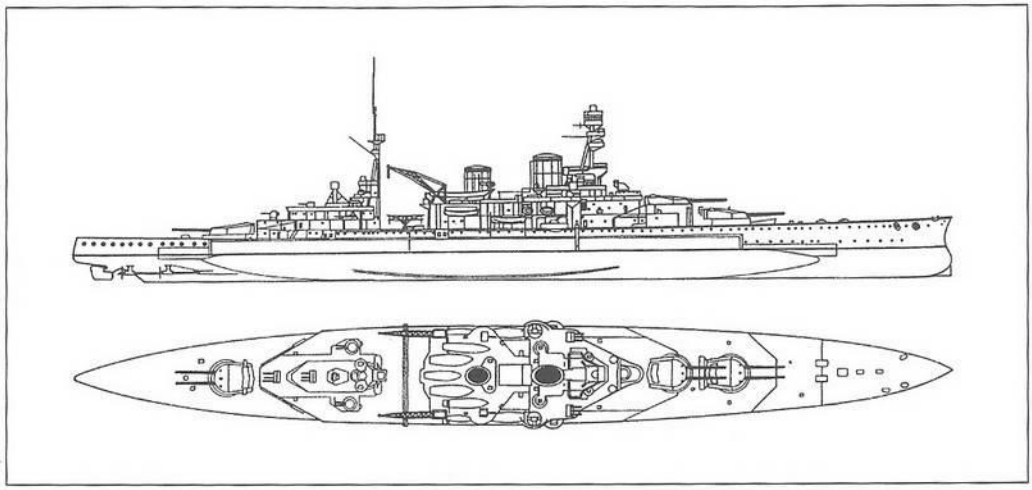
Max. Speed: 28kts.
Range: 5,310nm/16kts.

Main Armament: 10 - 14in./45 [2x4, 1x2]
Secondary Armament: 16 - 5.25in./50 [8x2]
Torpedoes: none

Armor Belt: 15in.
Armor Deck: 6in.
Armor Main Guns: 13in.
Armor Secondary Guns: 2in.
Armor Conning Tower: 4.5in.

Catapults: 1
Aircraft: 2

Renown Class



Vessels[Date]: Renown [1916], Repulse [1916]

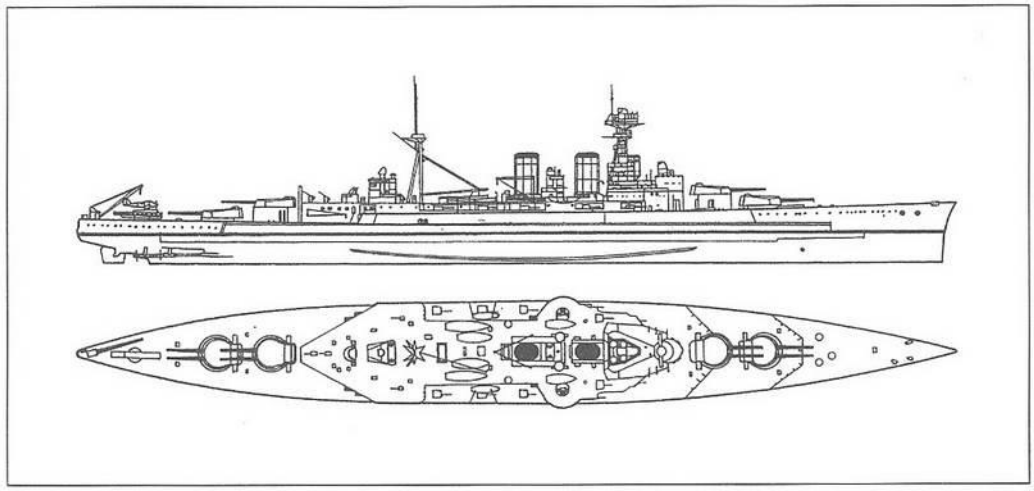
Displacement: 30,750 tons
Length: 750ft.

Max. Speed: 31kts. (28kts. Repulse)
Range: 3,650nm/10kts.

Main Armament: 6 - 15in./42 [3x2]
Secondary Armament: 20 - 4.5in./45 [10x2] (none Repulse)
Torpedoes: 8 - 21in. [fixed]

Armor Belt: 9in.
Armor Deck: 4in. (5.75in. Repulse)
Armor Main Guns: 9in.
Armor Secondary Guns: 2in. (none Repulse)
Armor Conning Tower: 3in. (10in. Repulse)

Catapults: 1
Aircraft: 2



Vessel[Date]: Hood [1920]

Displacement: 42,462 tons
Length: 850ft. 7in.

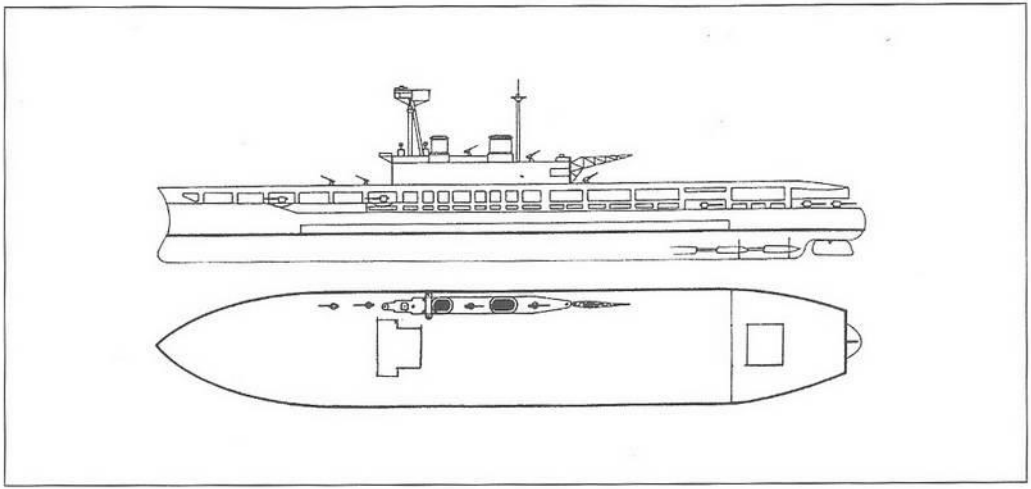
Max. Speed: 31kts.
Range: 8,500nm/14kts.

Main Armament: 8 - 15in./42 [4x2]
Secondary Armament: none
Torpedoes: none

Armor Belt: 12in.
Armor Deck: 5in.
Armor Main Guns: 15in.
Armor Secondary Guns: 6in.
Armor Conning Tower: 11in.

Catapults: none
Aircraft: none

Eagle Class



Vessel[Date]: Eagle [1924]

Displacement: 22,600 tons
Length: 625ft.

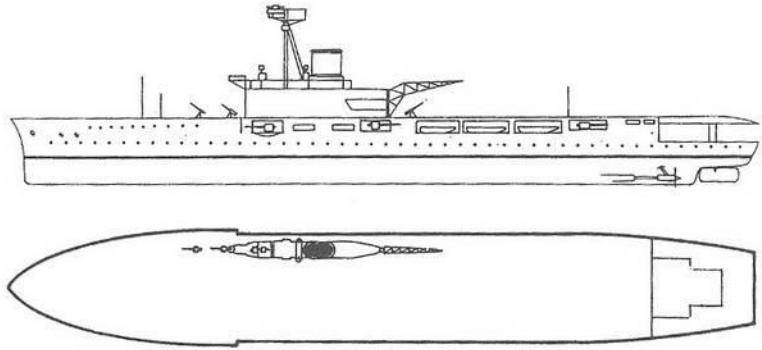
Max. Speed: 24kts.
Range: 4,800nm/16kts.

Main Armament: 9 - 6in./50/XXII [9x1 casemate]
Secondary Armament: none
Torpedoes: none

Armor Belt: 7in.
Armor Deck: 3.5in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 21

Hermes Class



Vessel[Date]: Hermes [1924]

Displacement: 10,850 tons
Length: 548ft.

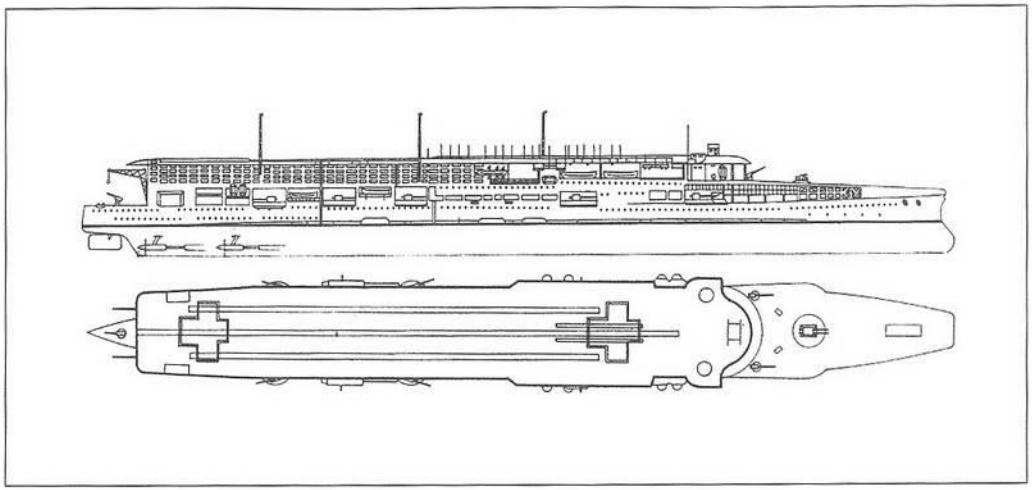
Max. Speed: 26kts.
Range: 4,480nm/16kts.

Main Armament: 6 - 5.5in./50 [6x1 casemate]
Secondary Armament: none
Torpedoes: none

Armor Belt: 1.5in.
Armor Deck: 3in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 15

Furious Class



Vessel[Date]: Furious [1925]

Displacement: 22,450 tons
Length: 735ft.

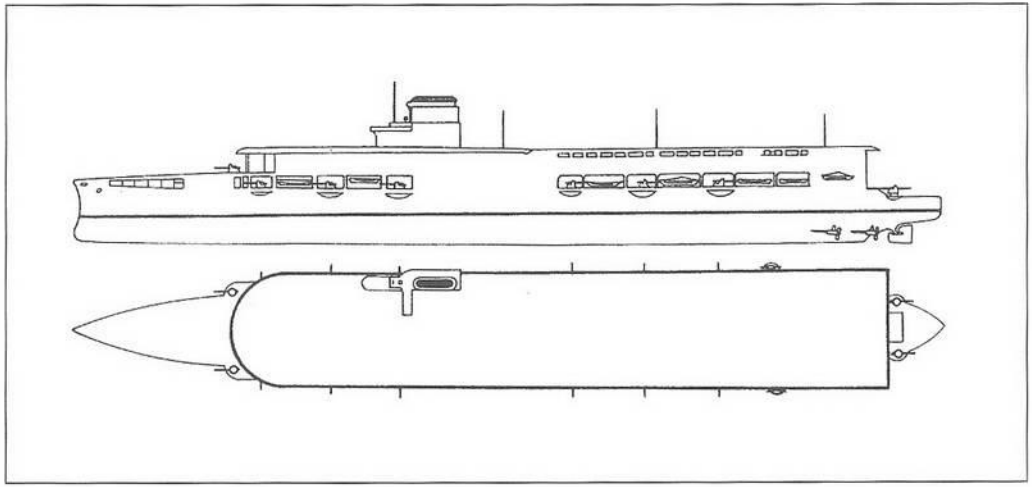
Max. Speed: 30kts.
Range: 5,610nm/16kts.

Main Armament: none
Secondary Armament: none
Torpedoes: none

Armor Belt: 3in.
Armor Deck: 3in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 36

Courageous Class



Vessels[Date]: Courageous [1928], Glorious [1930]

Displacement: 22,500 tons
Length: 735ft.

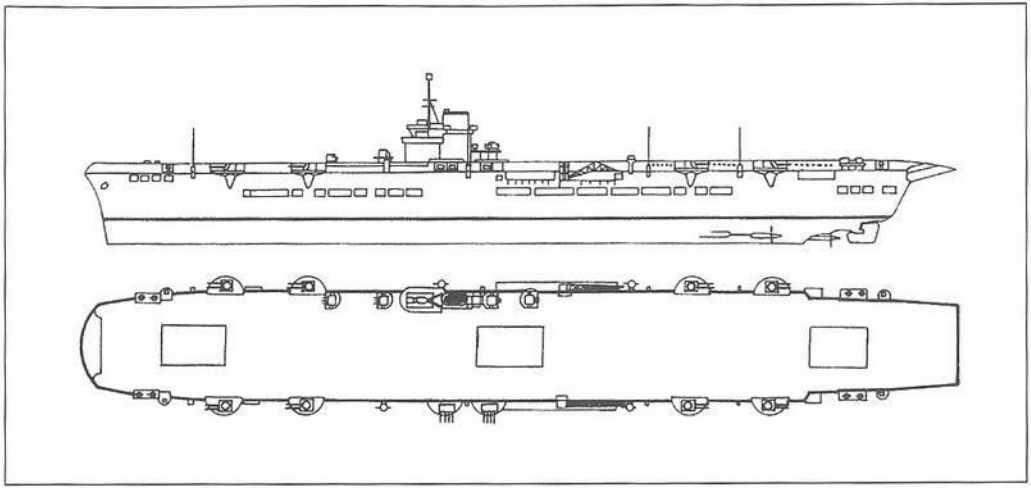
Max. Speed: 30kts.
Range: 5,300nm/16kts.

Main Armament: 16 - 4.7in./40 [16x1]
Secondary Armament: none
Torpedoes: none

Armor Belt: 3in.
Armor Deck: 2in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 48

Ark Royal Class



Vessel[Date]: Ark Royal [1938]

Displacement: 22,000 tons
Length: 685ft.

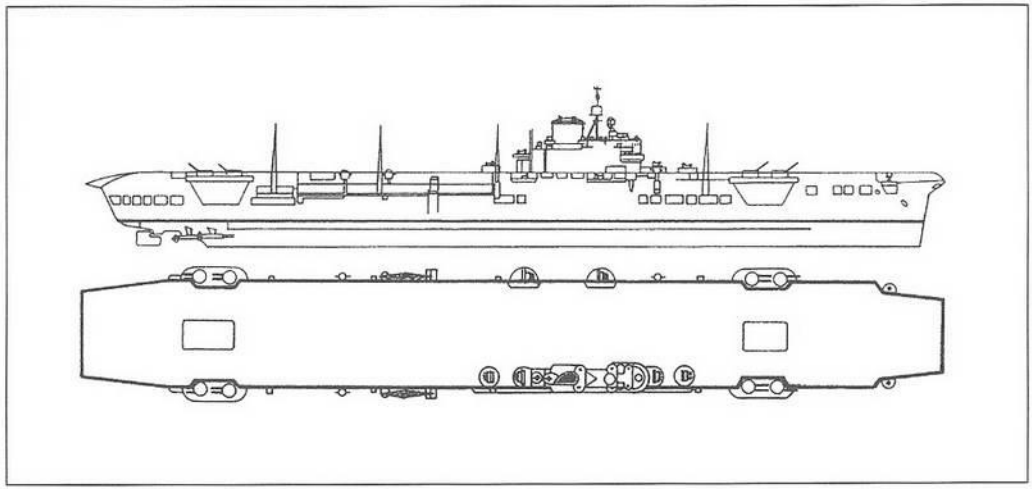
Max. Speed: 31kts.
Range: 4,300nm/12kts.

Main Armament: 16 - 4.5in./45 [8x2]
Secondary Armament: none
Torpedoes: none

Armor Belt: 4.5in.
Armor Deck: 3.5in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 60

Illustrious Class



Vessels[Date]: Illustrious [1940], Formidable [1940], Victorious [1941], Indomitable [1941]

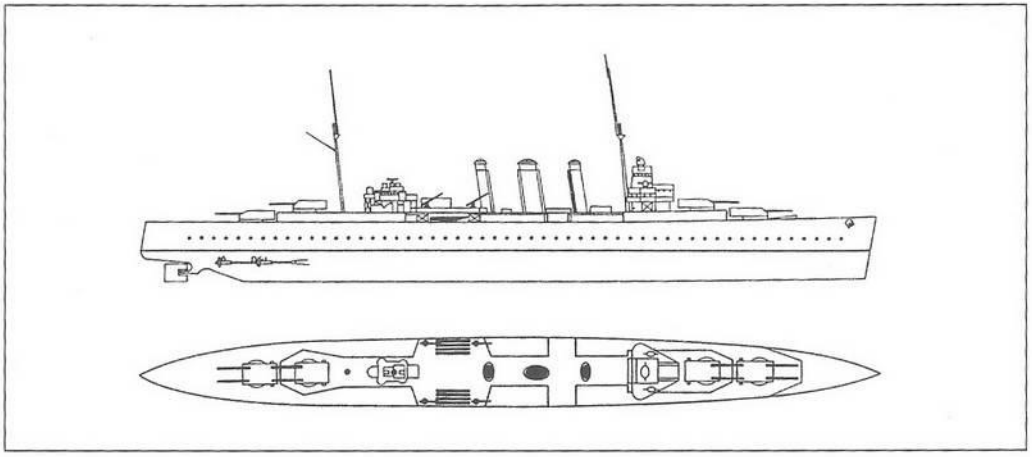
Displacement: 23,207 tons (23,080 tons Indomitable)
Length: 673ft.

Max. Speed: 31kts.
Range: 14,000nm/10kts. (13,000nm/10kts. Indomitable)

Main Armament: 16 - 4.5in./45 [8x2]
Secondary Armament: none
Torpedoes: none

Armor Belt: 4.5in.
Armor Deck: 3in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: 30 (45 Indomitable)



Class[Date] and Vessels:
Kent Class [1928]: Kent, Suffolk, Cumberland, Cornwall, Berwick, Australia, Canberra
London Class [1929]: London, Sussex, Shropshire, Devonshire
Norfolk Class [1930]: Norfolk, Dorsetshire

Displacement: 10,900 tons (10,575 tons London Class)
Length: 590ft. (595ft. London and Norfolk Classes)

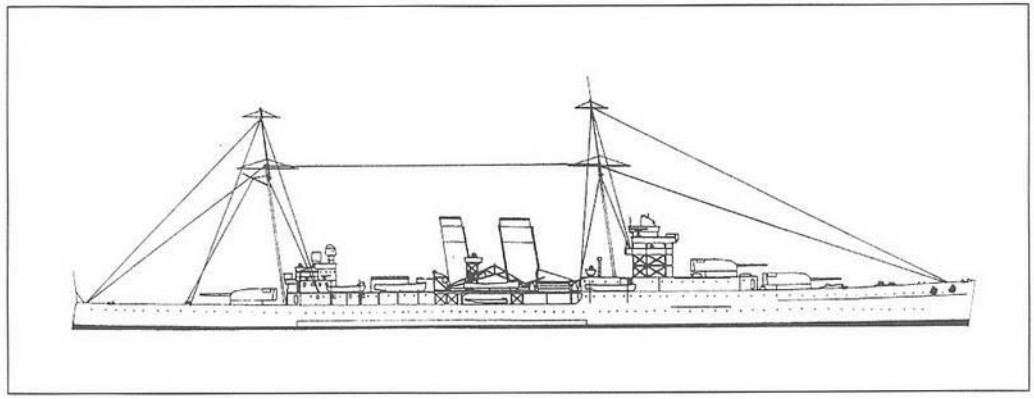
Max. Speed: 32kts.
Range: 13,300nm/12kts. (12,500nm/12kts. London and Norfolk Classes)

Main Armament: 8 - 8in./50 [4x2]
Secondary Armament: none
Torpedoes: 8 - 21in. [2x4]

Armor Belt: 4.5in. (none Canberra; 3in. London and Norfolk Classes)
Armor Deck: 1.5in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 1 (3 Suffolk, Cumberland, Cornwall, Berwick, and the London and Norfolk Classes)

York/Exeter Class



Vessels[Date]: York [1930], Exeter [1931]

Displacement: 8,250 tons (8,390 tons Exeter)
Length: 540ft.

Max. Speed: 32kts.
Range: 12,500nm/12kts.

Main Armament: 6 - 8in./50 [3x2]
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 3in.
Armor Deck: 1.5in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 1 (2 Exeter)

E Class

(No historical reference available)

Vessels[Date]: Emerald [1926], Enterprise [1926]

Displacement: 7,565 tons
Length: 535ft.

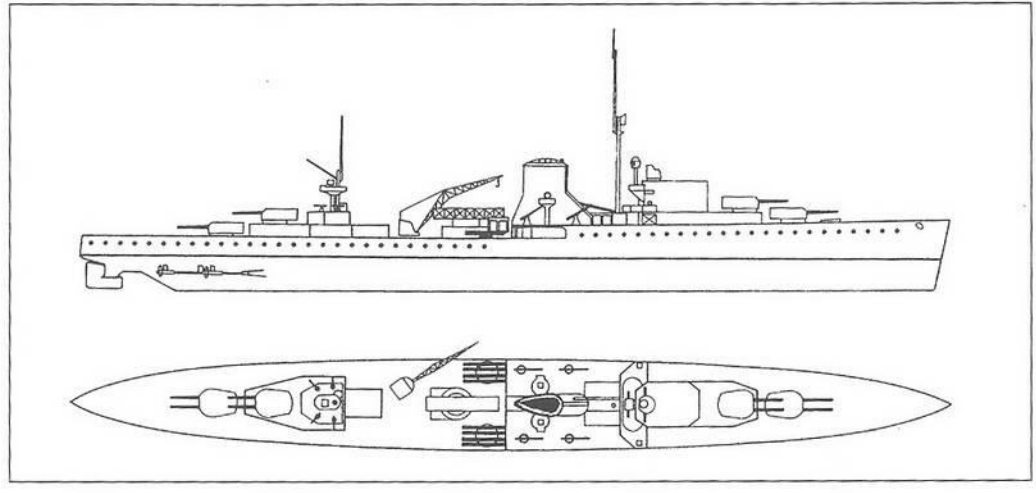
Max. Speed: 32kts.
Range: 3,850nm/20kts.

Main Armament: 7 - 6in./50/XXII [7x1]
Secondary Armament: none
Torpedoes: 16 - 21in. [4x4]

Armor Belt: 3in.
Armor Deck: 2in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 1

Leander Class



Vessels[Date]: Leander [1933], Orion [1934], Achilles [1933], Neptune [1934], Ajax [1935], Sydney [1935], Perth [1937], Hobart [1936]

Displacement: 7,270 tons (6,830 tons Sydney, Perth, and Hobart)
Length: 522ft.

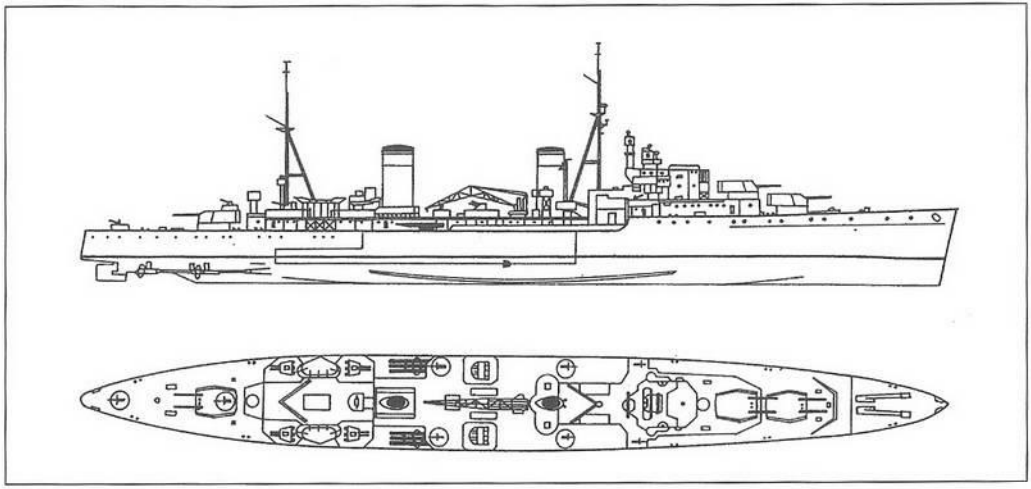
Max. Speed: 33kts.
Range: 11,000nm/12kts.

Main Armament: 8 - 6in./50/XXIII [4x2]
Secondary Armament: none
Torpedoes: 8 - 21in. [2x4]

Armor Belt: 4in.
Armor Deck: 2in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 1

Arethusa Class



Vessels[Date]: Arethusa [1935], Galatea [1935], Penelope [1936], Aurora [1937]

Displacement: 5,220 tons
Length: 480ft.

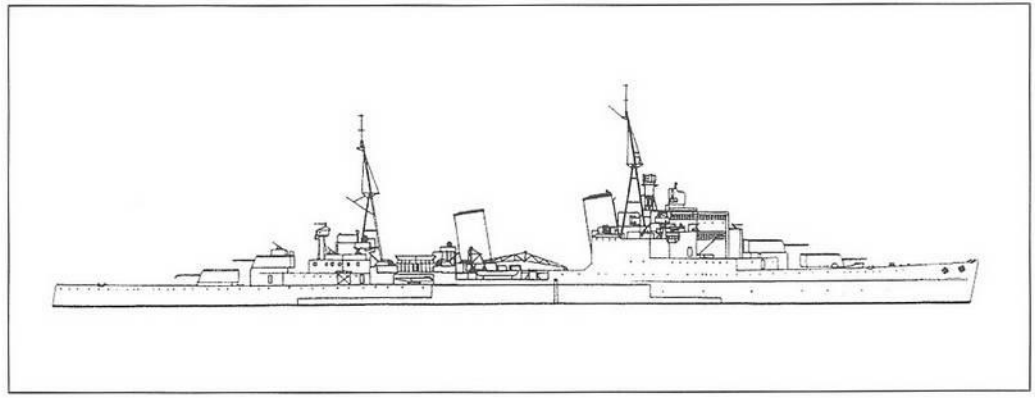
Max. Speed: 32kts.
Range: 6,500nm/16kts.

Main Armament: 6 - 6in./50/XXIII [3x2]
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 2.25in.
Armor Deck: 2in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1 (none Aurora)
Aircraft: 1 (none Aurora)

Southhampton Class



Vessels[Date]: Newcastle [1937], Southhampton [1937], Sheffield [1937], Glasgow [1937], Birmingham [1937], Manchester [1938], Liverpool [1938], Gloucester [1938]

Displacement: 9,100 tons (9,400 tons Manchester, Liverpool, and Glouchester)
Length: 558ft.

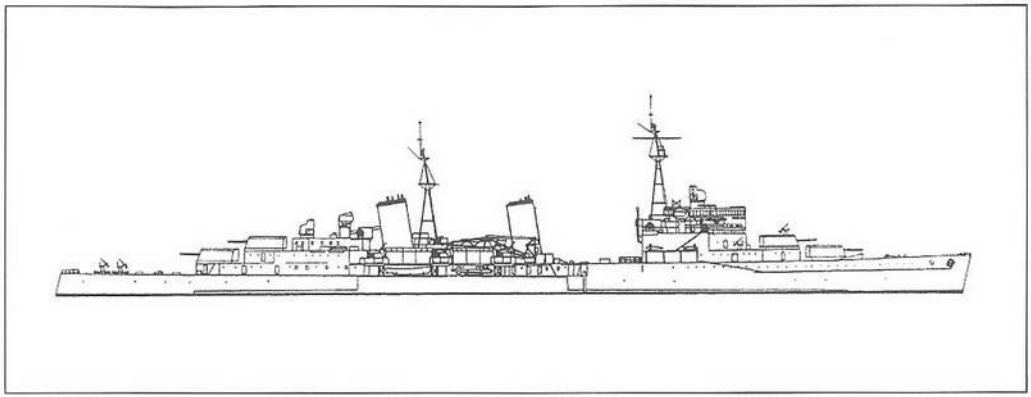
Max. Speed: 32kts.
Range: 11,000nm/12kts.

Main Armament: 12 - 6in./50/XXIII [4x3]
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 4.5in.
Armor Deck: 2in.
Armor Main Guns: 2in. (4in. Manchester, Liverpool, and Glouchester)
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 3

Edinburgh Class



Vessels[Date]: Edinburgh [1938], Belfast [1939]

Displacement: 10,550 tons
Length: 579ft.

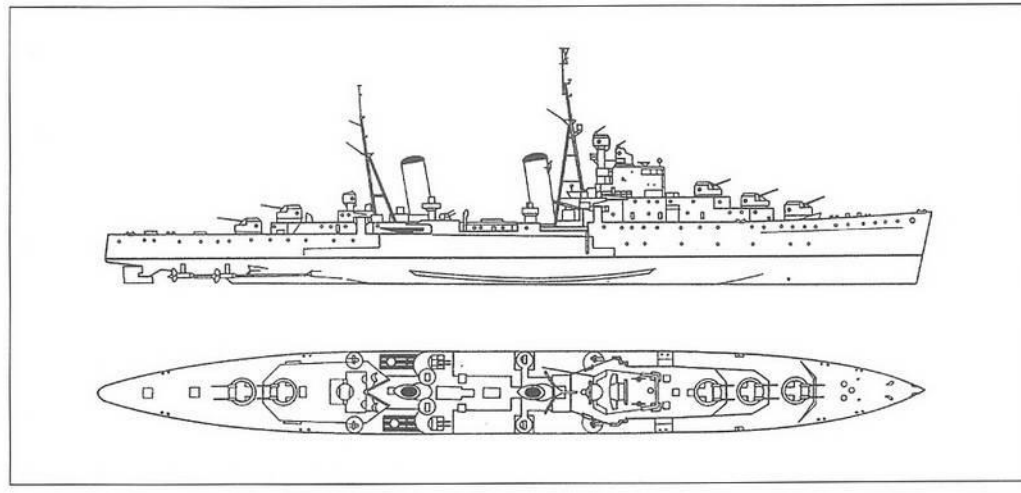
Max. Speed: 33kts.
Range: 10,000nm/12kts.

Main Armament: 12 - 6in./50/XXIII [4x3]
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 4.5in.
Armor Deck: 3in.
Armor Main Guns: 4in.
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 3

Dido Class



Vessels[Date]: Dido [1940], Bonaventure [1940], Naiad [1940], Phoebe [1940], Euryalus [1941], Hermione [1941], Sirious [1942], Cleopatra [1941], Charybdis [1941], Scylla [1942], Argonaut [1942]

Displacement: 5,600 tons
Length: 485ft.

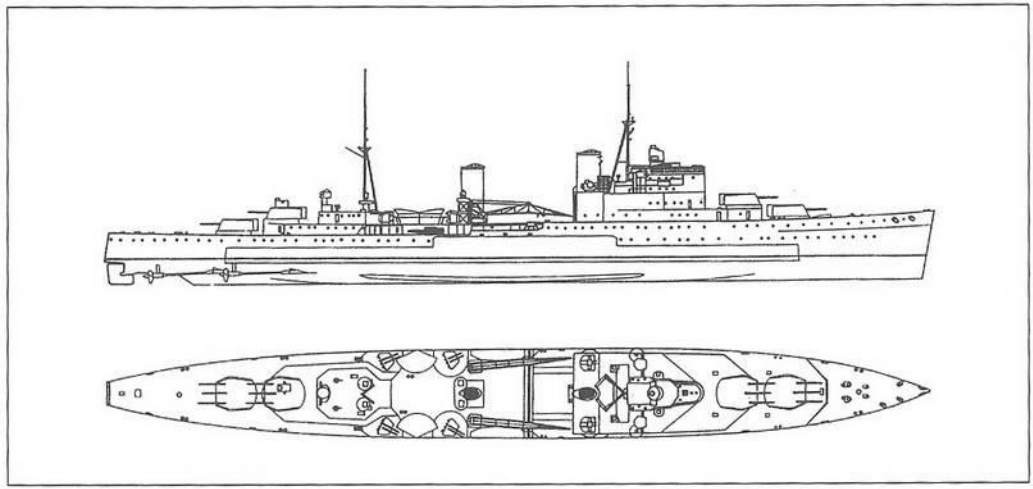
Max. Speed: 32kts.
Range: 5,500nm/16kts.

Main Armament: 8 - 5.25in./45 [4x2] (10 - 5.25in./50 [5x2] Naiad, Euryalus, Hermione, Sirious, Cleopatra, and Argonaut; 8 - 4.5in./45 [4x2] Charybdis, and Scylla)
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 3in.
Armor Deck: 2in.
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: none

Fiji Class



Vessels[Date]: Fiji [1940], Kenya [1940], Nigeria [1940], Mauritius [1941], Trinidad [1941], Gambia [1942], Jamaica [1942], Bermuda [1942]

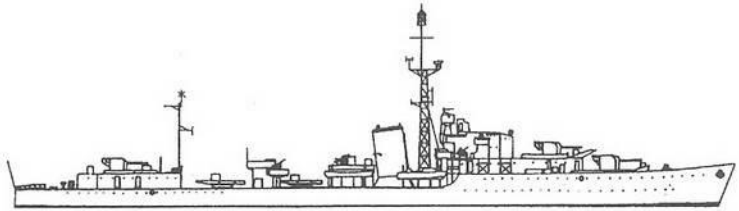
Displacement: 8,530 tons
Length: 538ft.

Max. Speed: 32kts.
Range: 12,500nm/12kts.

Main Armament: 12 - 6in./50/XXIII [4x3]
Secondary Armament: none
Torpedoes: 6 - 21in. [2x3]

Armor Belt: 3.5in.
Armor Deck: 2in.
Armor Main Guns: 2in.
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: 1
Aircraft: 2



Classes[Date]: Tribal [1938-9], J [1939], K [1939], L [1940-2], M [1942-3], N [1940-2]

Displacement: 1,690 tons - 1,935 tons
Length: 339ft. 6in. - 345ft. 6in.

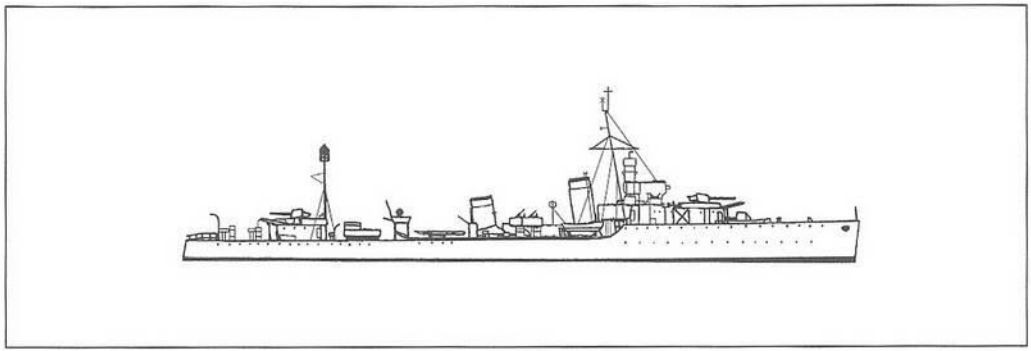
Max. Speed: 36kts. (37kts. Tribal Class)
Range: 5,500nm/15kts.

Main Armament: 6 - 4.7in./45/XII [3x2] (8 - 4.7in./45/XII [4x2] Tribal Class)
Secondary Armament: none
Torpedoes: 10 - 21in. [2x5] (4 - 21in. [1x4] Tribal Class; 8 - 21in. [2x4] L and M Classes)

Armor Belt: none
Armor Deck: none
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: none

Standard Destroyers



Classes[Date]: A [1929], B [1930], C [1931], D [1932], E [1934], F [1934], G [1935], H [1935], I [1936], O [1941-2], P [1941], Q [1942], R [1942-3], S [1942-4], T [1943-4]

Displacement: 1,350 tons - 1,935 tons
Length: 309ft. - 339ft. 6in.

Max. Speed: 35 - 37kts.
Range: 3,500nm/15kts.

Main Armament: 4 - 4.7in./45/IX [4x1] (5 - 4.7in./45/IX [5x1] Flotilla leaders; 4 - 4in./45 [4x1] P Class)
Secondary Armament: none

Torpedoes: 8 - 21in. [2x4] (10 - 21in. [2x5] Glowworm and I Class; 4 - 21in. [1x4] plus extra AA, ASW, or mines (select ships in all classes))

Armor Belt: none
Armor Deck: none
Armor Main Guns: none
Armor Secondary Guns: none
Armor Conning Tower: none

Catapults: none
Aircraft: none

German Gunnery

Size (in.)	Gun Caliber	Warhead Weight (lb.)	Range (yds.)	Reload Time (seconds)
15	47	1,750	39,200	26
11	54.5	700	46,100	20
8	60	250	36,300	14
5.9	55	95	24,600	9
5.9	50	95	23,800	9
5	45	60	22,300	6
4.1	65	40	23,500	6

British Gunnery

Size (in.) /Mark	Shell Caliber	Warhead Weight (lb.)	Range (yds.)	Reload Time (seconds)
16/I	45	2,048	39,100	38
15/I	42	1,938	33,550	30
14/VII	45	1,590	38,550	30
8/VIII	50	256	30,650	12
6/XXIII	50	112	25,500	13
6/XXII	50	100	25,800	13
5.5/I	50	82	18,500	6
5.25/I	50	80	23,500	8
4.7/XII	45	50	16,970	7
4.7/XI	50	62	21,300	6
4.7/IX	45	50	17,200	6
4.7/VIII	40	50	16,450	6
4.5/I-V	45	55	21,500	6
4/XVI,XXI	45	35.9	19,850	6

German Torpedoes

Name	Size (inches)	Warhead Weight (lb.)	Range (yds.) /Speed (kts.)
GVIIaT1	21	661	6,500/44 8,750/40
FV	17.7	440	1,500/40 4,000/24

British Torpedoes

Name	Size (inches)	Warhead Weight (lb.)	Range (yds.) /Speed (kts.)
Mk I	24.5	742	15,000/35 20,000/30
Mk IV	21	515	8,000/39 10,000/35 13,500/25
Mk VII	21	805	16,000/33
Mk X	21	661	3,280/47 8,750/36 13,120/29
Mk VIII	18	440	1,500/40 4,000/24

PENETRATION OF ARMOR

British	*5,000 YDS.*	*10,000 YDS.*	*15,000 YDS.*	*20,000 YDS.*	*25,000 YDS.*	*30,000 YDS.*
•16" GUN	29"	24"	18"	14"	*11.5"/4.5"	*10.75"/6"
•15" GUN	26"	21"	16"	12"	*9"/3.5	*6.5"/4.5"
•14" GUN	26"	21"	16"	12"	*9"/3.5	*6.5"/4.5"
• 8" GUN	10.5"	7"	4.5"	*3.25"/1.75"	*2"/2.5"	*.5"/3.25"
• 6" GUN	6.25"	4.5"	4"	*3"/1.75"	*1.75"/2.5"	*1"/2.75"

German	*5,000 YDS.*	*10,000 YDS.*	*15,000 YDS.*	*20,000 YDS.*	*25,000 YDS.*	*30,000 YDS.*
•15" GUN	29"	24"	18"	14"	*11.5"/4.5"	*9.75"/6"
•11" GUN	20.25"	16"	12"	9"	*7.25/3"	*6.5"/4"
• 8" GUN	10.5"	7"	4.5"	*3.25"/1.5"	*1.5"/2.5"	*.5"/4.25"

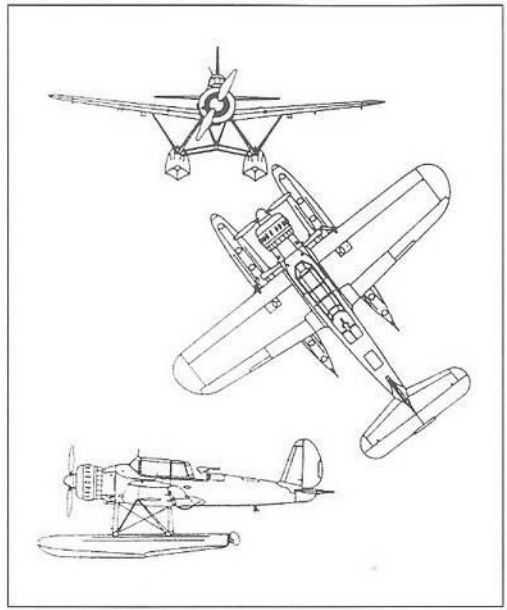
* *Belt Penetration/Deck Penetration*

Note: The penetration values are based upon the shell hitting exactly perpendicular to the target. Any deviation from this seriously degrades the penetration of the shell. A 10% deviation can deflect up to 40% of the potential penetration of the shell.

Airplane Data

German Reconnaissance

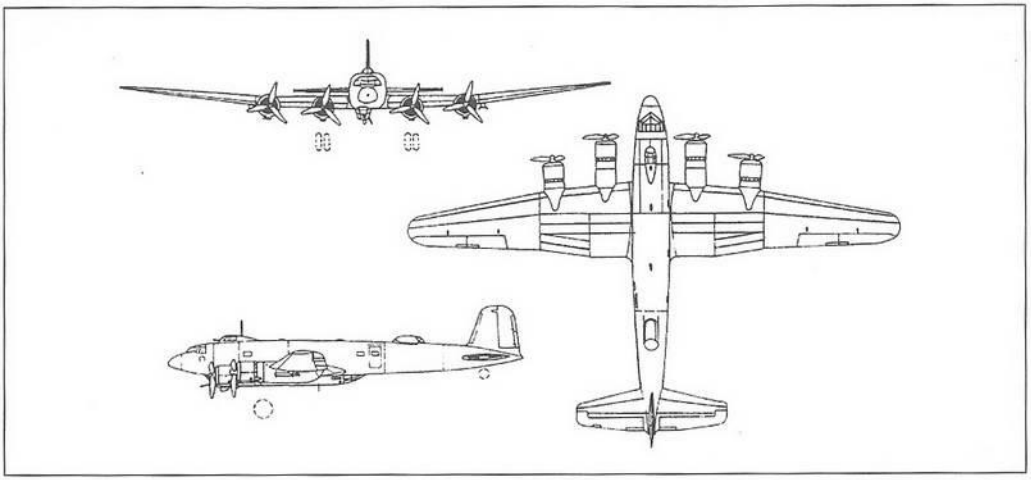
Arado Ar.196



Year: 1939
Engine: 960hp BMW132 K 9-cylinder radial air-cooled
Wingspan: 40ft. 8in.
Length: 36ft. 1in.
Height: 14ft. 7in.
Weight: 8,225lb.
Max. Speed: 193mph at 13,120ft.
Ceiling: 22,960ft.
Range: 665 miles
Armament: 1 - machine gun, 2 - 20mm cannons, 220lb. of bombs
Crew: 2

GERMAN
RECONNAISSANCE BOMBER

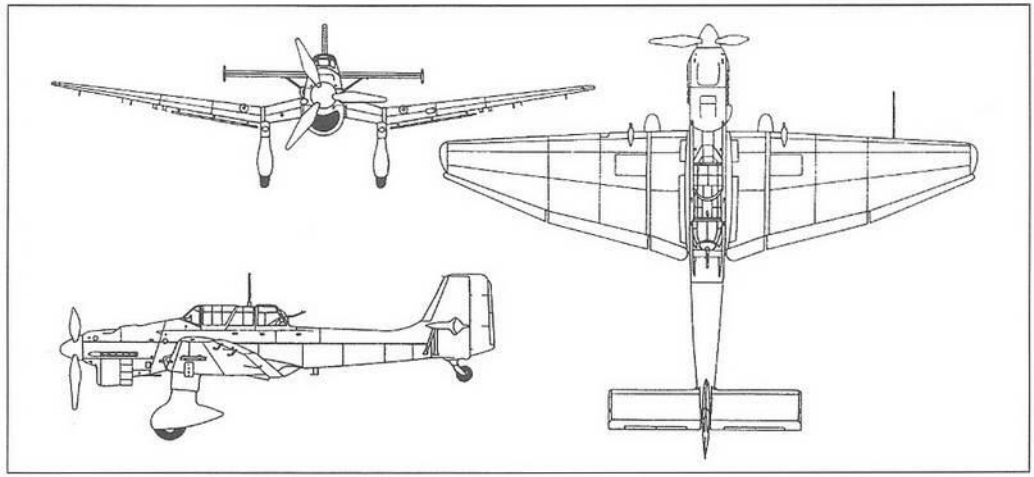
Focke Wulf Fw.200
Condor



Year: 1940
Engine: 4 - 830hp BMW132 H 9-cylinder radial air-cooled
Wingspan: 107ft. 9.5in.
Length: 77ft.
Height: 20ft. 8in.
Weight: 50,045lb.
Max. Speed: 224mph at 15,410ft.
Ceiling: 19,000ft.
Range: 2,206 miles
Armament: 4 - machine guns, 1 - 20mm cannon, 2,755lb. of bombs
Crew: 5

GERMAN
DIVE BOMBER

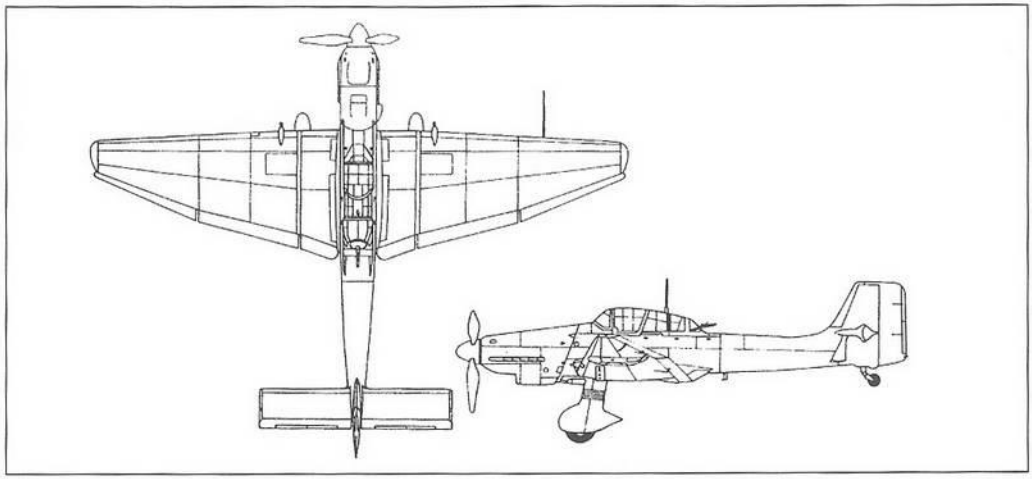
Junkers Ju.87B Stuka



Year: 1938
Engine: 1,200hp Junkers Jumo 211 12-cylinder V liquid-cooled
Wingspan: 45ft. 3in.
Length: 36ft. 5in.
Height: 13ft. 2in.
Weight: 9,560lb.
Max. Speed: 238mph at 13,410ft.
Ceiling: 26,250ft.
Range: 490 miles
Armament: 3 - machine guns, 1,100lb. of bombs
Crew: 2

GERMAN
DIVE BOMBER

Junkers Ju.87D

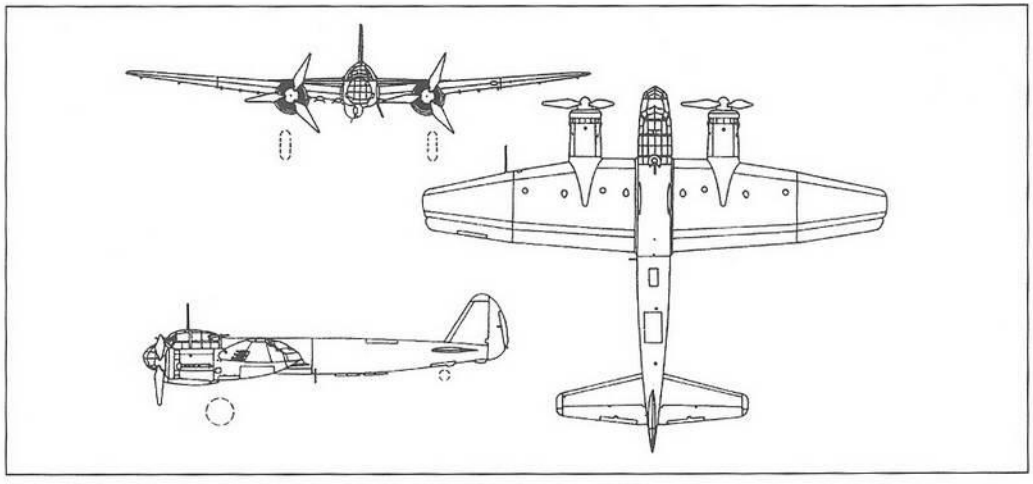


Year: 1941
Engine: 1,400hp Junkers Jumo 211J-1 12-cylinder V liquid-cooled
Wingspan: 45ft. 3in.
Length: 37ft. 9in.
Height: 12ft. 9in.
Weight: 12,880lb.
Max. Speed: 255mph at 13,500ft.
Ceiling: 23,905ft.
Range: 954 miles
Armament: 4 - machine guns, 3,968lb. of bombs
Crew: 2

GERMAN BOMBER

(DIVE BOMBER, TORPEDO-BOMBER)

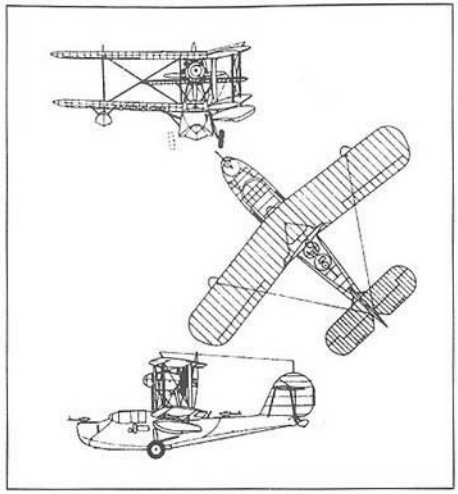
Junkers Ju.88



Year: 1939
Engine: 2 - 1,200hp Junkers Jumo 211B 12-cylinder V liquid-cooled
Wingspan: 60ft. 3in.
Length: 47ft. 1in.
Height: 17ft. 6in.
Weight: 22,840lb.
Max. Speed: 280mph at 18,050ft.
Ceiling: 26,250ft.
Range: 1,056 miles
Armament: 3 - machine guns, 3,960lb. of bombs (1 - 17.7in. torpedo)
Crew: 4

BRITISH
RECONNAISSANCE

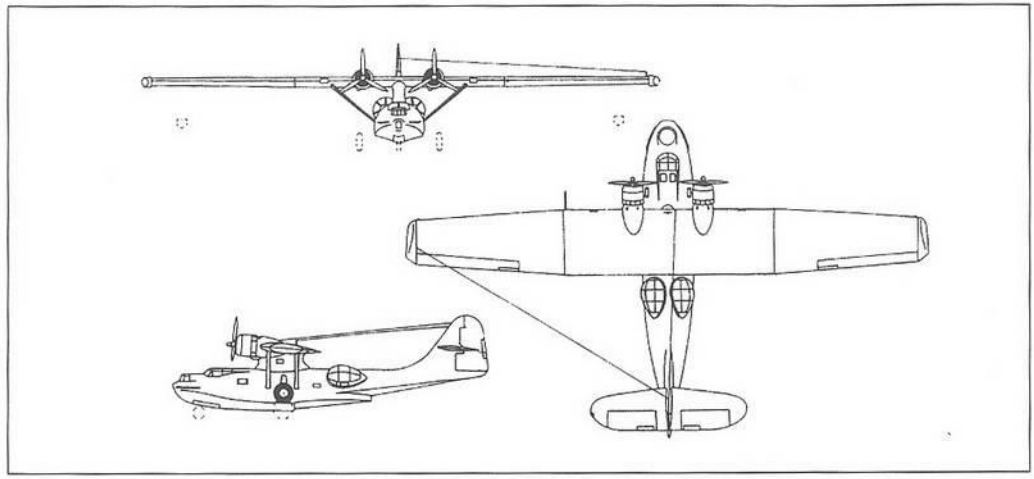
Supermarine Walrus



Year: 1936
Engine: 775hp Bristol Pegasus 11.M.2 9-cylinder radial air-cooled
Wingspan: 45ft. 10in.
Length: 37ft. 7in.
Height: 15ft. 3in.
Weight: 7,200lb.
Max. Speed: 135mph at 4,750ft.
Ceiling: 18,500ft.
Range: 600 miles
Armament: 2 - machine guns
Crew: 4

British Reconnaissance

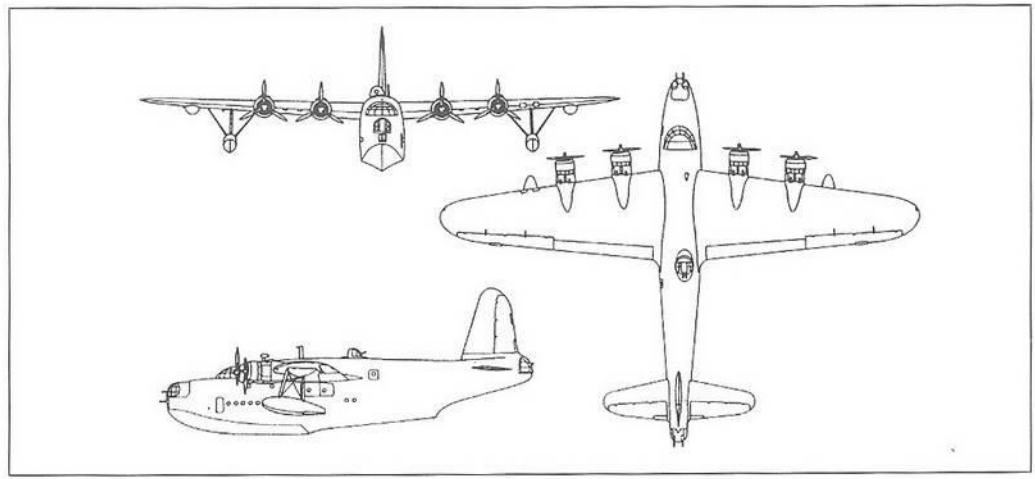
Consolidated PBY-5A Catalina



Year: 1941
Engine: 2 - 1,200hp Pratt & Whitney R-1830-82 Twin Wasp 14-cylinder radial air-cooled
Wingspan: 104ft.
Length: 63ft. 10in.
Height: 20ft. 2in.
Weight: 35,420lb.
Max. Speed: 175mph at 7,000ft.
Ceiling: 18,100ft.
Range: 2,350 miles
Armament: 5 - machine guns, 4,000lb. of bombs
Crew: 7-9

British Reconnaissance

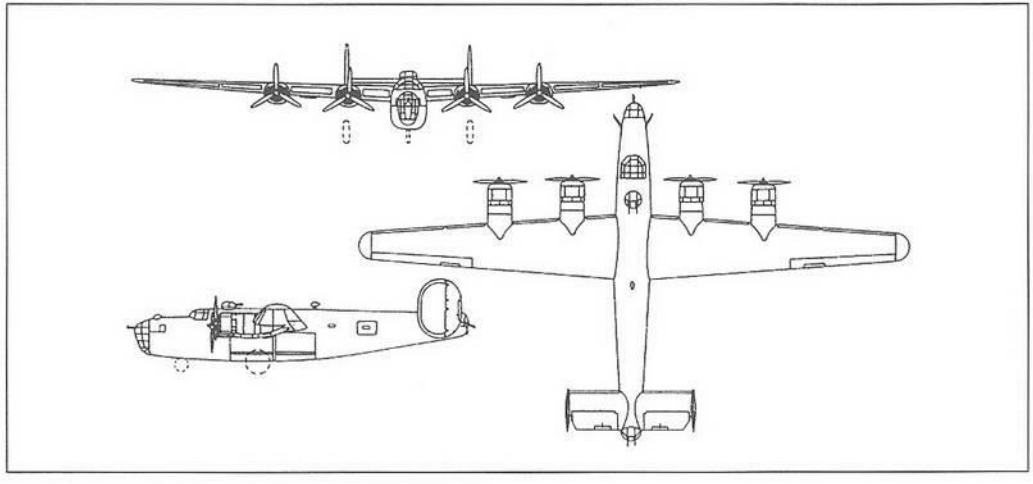
Short Sunderland



Year: 1938
Engine: 4 - 1,010hp Bristol Pegasus XXII 9-cylinder radial air-cooled
Wingspan: 112ft. 9in.
Length: 85ft. 4in.
Height: 32ft. 10in.
Weight: 50,100lb.
Max. Speed: 210mph at 6,500ft.
Ceiling: 17,900ft.
Range: 2,980 miles
Armament: 7 - machine guns, 2,000lb. of bombs
Crew: 13

British Reconnaissance Bomber

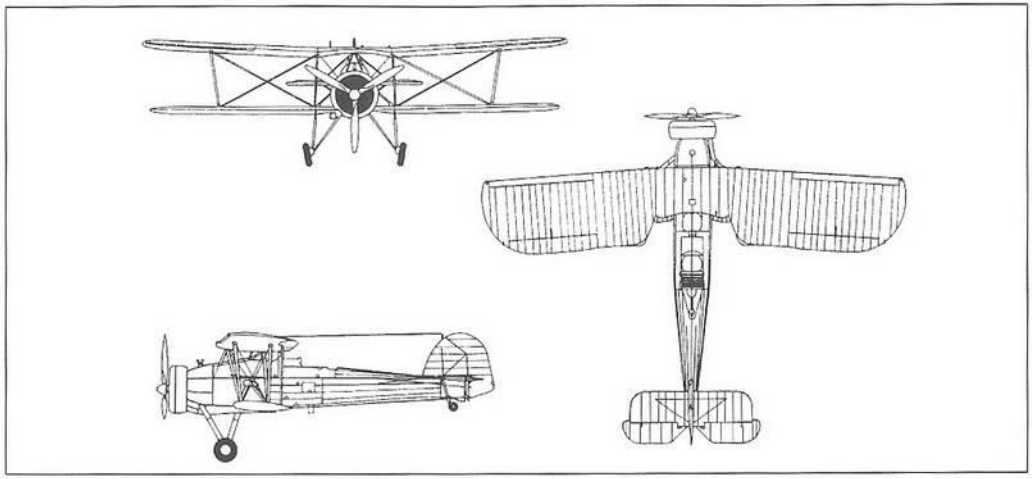
Consolidated B-24D Liberator



Year: 1942
Engine: 4 - 1,200hp Pratt & Whitney R-1830-43 twin Wasp 14-cylinder radial air-cooled
Wingspan: 110ft.
Length: 66ft. 4in.
Height: 17ft. 11in.
Weight: 60,000lb.
Max. Speed: 303mph at 25,000ft.
Ceiling: 32,000ft.
Range: 2,850 miles
Armament: 10 - machine guns, 8,000lb. of bombs
Crew: 8-10

BRITISH
TORPEDO-BOMBER

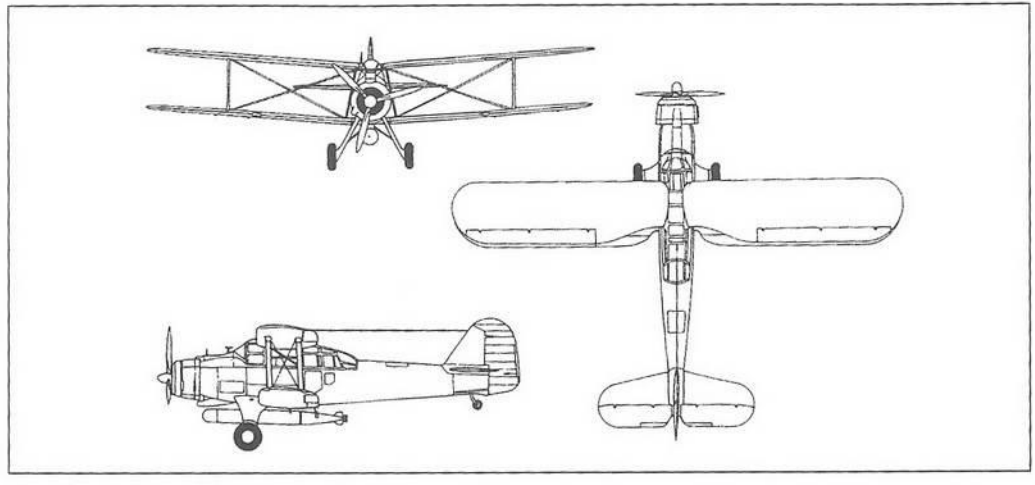
Fairey Swordfish



Year: 1936
Engine: 690hp Bristol Pegasus III.M3 9-cylinder radial air-cooled
Wingspan: 45ft. 6in.
Length: 36ft. 4in.
Height: 12ft. 10in.
Weight: 9,250lb.
Max. Speed: 139mph at 4,750ft.
Ceiling: 10,700ft.
Range: 546 miles
Armament: 2 - machine guns, 1 - 18in. torpedo
Crew: 2-3

British
Torpedo-Bomber

Fairey Albacore



Year: 1940
Engine: 1,065hp Bristol Taurus II 14-cylinder radial air-cooled
Wingspan: 50ft.
Length: 39ft. 9.5in.
Height: 15ft. 3in.
Weight: 10,600lb.
Max. Speed: 161mph at 4,000ft.
Ceiling: 20,700ft.
Range: 930 miles
Armament: 3 - machine guns, 1 - 18in. torpedo
Crew: 3

Aft: toward the back of a ship; in the back part of a ship.

All-or-nothing armor: an armoring concept in which a system within a ship is either protected by the maximum armor thickness available or is not protected at all.

AP: armor-piercing ammunition designed to break through armored plates (and therefore not effective against unarmored targets).

Armor belt: a series of hardened steel plates along the side of a ship to protect it from shots hitting it from the side.

Armor deck: a thick deck made of hardened steel to protect a ship from bombs and high-trajectory shots hitting it from above.

Barbette: an armored casing underneath a battleship turret to protect the connections between the turret and the ammunition magazines below.

Battery: a group of guns, usually firing together.

Battlecruiser: a warship design that carried guns comparable to a battleship's, but which sacrificed armor for a faster speed.

Beam: (1) the width of a ship; (2) to the side of a ship.

Bearing: the compass direction from one ship to another ship.

Bow: the front end of a ship.

Bridge: a platform or open compartment above the deck level of a ship from which the vessel is commanded.

Broadside: the use of all main guns on a ship, only possible when firing to one side or the other.

Caliber: the diameter of the bore of a gun.

Catapult: a device used to hurl a plane from the deck of a ship into the air.

Citadel: an armoring concept in which the ship's vital systems are concentrated and protected by the full weight of the ship's armor.

Class: a set of ships built in quick succession sharing the same basic design.

Commission: to bring a ship into service (several more months were usually needed to work the ship up to combat readiness).

Conning tower: (1) an armored pilothouse on a surface vessel; (2) a raised structure on the deck of a submarine used for observation and entry.

Course: the direction in which a ship is intended to move.

Counter-flood: to deliberately let water into one side of a ship to reduce the list caused by damage to the other side.

Director: in a warship, the station from which a single officer or staff directs the fire of all or a set of the ship's guns.

Displacement: the weight of water a ship displaces, used as a measure of the ship's total size (although the weight can vary according to the amount of equipment and supplies loaded on the hull).

DP gun: dual-purpose gun, a gun capable of firing accurately at ships and aircraft.

Draught: the depth of the deepest part of a ship underwater.

Dreadnought: (1) the *HMS Dreadnought*, the first battleship armed with a set of large-caliber guns of a uniform size as its main armament (as opposed to a mixture of large and medium size guns); (2) any subsequent battleship incorporating the *HMS Dreadnought's* basic design.

Fire Control: the direction of a ship's gunfire.

Flag Bridge: the command center from which the commander of a task force controls his forces.

Forward: (1) toward the bow of a ship; (2) in the front part of a ship.

HE: high explosive ammunition designed to create a maximum blast effect (and therefore not effective against armored targets).

Heading: the direction in which a ship's bow is pointing.

Heavy cruiser: a warship smaller than a battleship, but protected by some armor and carrying main guns of about 8in.

Immune zone: the range at which a battleship's vitals cannot be hit by another battleship because it is too far for flat-trajectory shots to pierce the armored belt but too close for high-trajectory shots to pierce the armored deck.

Keel: the central timbers or plates at the bottom of a ship.

Knot: a measure of speed in the water based on nautical miles per hour.

Laying down: usually the first step in building a ship; constructing the keel.

Launch: to put a ship in the water (note that this was generally done long before the ship was ready for service; the remaining construction activity took place while the ship was afloat).

Light cruiser: a warship smaller than a heavy cruiser, protected by some armor and carrying main guns of about 6in.

Local control: fire control by each turret individually.

Machinery: a ship's engines.

Main armament: the primary battery of guns on a ship, generally designed for engaging other ships of the same general size.

Nautical mile: a maritime measure of distance equal to 6,080 feet.

Operations: in naval terms, (1) the coordinated activities of a number of ships toward a specific goal; (2) the way in which a navy conducts its activities as a whole.

Port: (1) a developed harbor; (2) nautical term for the left-hand side of a ship.

Quarter: the after part of a ship's side.

Rangefinder: a device, optical or electronic, designed to determine the distance from one ship to another as an aid to gunnery.

Refit: a process in which a ship is re-equipped with more modern equipment, extending the useful life of an older vessel.

Salvo: a simultaneous discharge of shots from a battery of guns.

Secondary armament: batteries of guns on a ship of a smaller caliber than the main armament, generally designed for engaging smaller craft.

Shafts: the axles linking a ship's engines to its propellers, used as a measure of the number of propellers (i.e., a ship is said to have three shafts if it has three propellers).

Spotting Fire: rounds fired by a warship in order to observe the waterspouts to correct the aim of the battery.

Spread: the distance between projectiles, whether shells from a gun or torpedoes (the wider the spread, the greater the likelihood of a hit, but the less powerful the blow).

Starboard: nautical term for the right-hand side of a ship.

Stern: the back end of a ship.

Trajectory: the arc which a shell follows as it moves through the air.

Work up: to prepare a newly commissioned ship and its crew for active service.

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GREAT NAVAL BATTLES:
NORTH ATLANTIC 1939-43

PLAYER'S GUIDE

SELECTING GAME OPTIONS

This section contains the information you need to play GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43. It is written with reference to a mouse-equipped machine, but keyboard equivalents to mouse actions can also be used. These keyboard equivalents and other machine-specific instructions are given in the User's Guide included with the game.

GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 includes a variety of scenarios and game features. As you begin a new game, you are given the opportunity to select from the available options in a series of menus. Each menu presents one basic choice, and the menus progress in logical order, reflecting the choices you make.

If you decide to change your choices during the process of selecting the game options, click on the CANCEL button on the current screen; you will be given the opportunity to change previously selected options.

THE CHOOSE GAME MENU

This menu enables you to choose the type of game that you want to play. GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 offers three types of games, which differ in length and complexity. In addition, this menu enables you to resume a saved game or watch a replay of an old game.

ENGAGEMENTS

Engagements are the shortest and simplest types of games you can choose. An engagement simulates an encounter between two ships or task forces that are in contact as the battle begins, and lasts anywhere from five minutes to a couple of hours.

Once you click on the "Engagements" option, you can pick the specific engagement from the "Choose Scenario" menu described below.

Operations

The pace of the surface war in the North Atlantic was set by the sorties of major German warships. Periods of lull in which the British patrolled and both sides prepared alternated with episodes of intense action involving dozens of ships maneuvering across the entire ocean. The Operations included in this game cover the most significant periods of intense action, starting as the Germans sortie onto the high seas, and lasting for the duration of the voyage, which can vary from a few days to many weeks.

Once you click on the "Operations" option, you can pick the specific operation from the "Choose Scenario" menu described below.

The Campaign

The Campaign game spans the first crucial years of the war, from the beginnings in the Fall of 1939 until 1943, when British survival and Allied victory hung in the balance. It puts you in command of the entire surface contest. You control the actions of the battleships, cruisers, and fleet destroyers that formed the backbone of the battle fleets, integrating them with the activities of their supporting forces.

The Campaign is discussed in more detail in the "Historical Background" section, starting on page 4.

Saved Scenarios

These options enable you to resume previously saved games. This gives you a chance to choose the specific saved game from the "Load Saved Game" menu described below.

Watch Replay

This option enables you to view a replay of an old engagement. Selecting this option gives you a chance to choose the specific game film from the "Load Replay" menu described below.

The CHOOSE SCENARIO Menu

If you pick the "Engagements" or "Operations" options on the "Choose Game" menu, you get a chance to pick the specific engagement or operation you want to play. This menu displays the title and a brief description of each available scenario of the type chosen. To cycle through the available operations click on the NEXT or PREV buttons; to select the operation you want to play click on the LOAD button.

The Engagements and Operations included in the game are discussed in more detail in the "Historical Background" section, starting on page 4.

The CHOOSE SIDE Menu

If you choose the "Engagements", "Operations", or "Campaign" options on the "Choose Game" menu, you will be given the choice of commanding the British or the Germans. To indicate your choice, simply click on the appropriate button.

The LOAD SAVED GAME Menu

If you pick one of the "Saved" options, you will be given a chance to specify the engagement, scenario, or campaign you want to resume. For specific loading instructions, see the User's Guide included with the game.

The LOAD REPLAY Menu

If you pick the "Watch Replay" option, you will be given a chance to specify the engagement you want to watch. For specific loading instructions, see the User's Guide included with the game.

THE MENU BAR

The Menu Bar gives you quick access to a variety of game functions. It appears at the top of the screen when you press the right mouse button. Further instructions for the menu system are given in the User's Guide.

FILE

This menu enables you to create a save file on disk and to leave the game before it is completed.

SAVE GAME

This option enables you to save a game in progress so that you can quit and resume it later. (Or try again if you lose!)

QUIT GAME

This option enables you to leave the current scenario. Note that the game does not return directly to DOS, but instead gives you a chance to record the game and pick another game if you desire.

OPTIONS

This menu enables you to control certain aspects of the game environment.

PAUSE GAME

This option enables you to suspend and restart the game. Its effect is to toggle the game clock on and off. Note that all game controls continue to function during the pause, so you can pause, input orders, and then resume.

SPEED

This option enables you to specify how fast the action should proceed, with "1" being the slowest value.

SOUND

This option toggles the game sounds on and off. It's especially useful when your spouse is asleep or your boss is in.

Stations (Flag Bridge and Action Stations Only)

This menu moves you from Station to Station within the active ship, or from the active ship to one of the higher command levels. Full information about each station can be found on the page indicated in parentheses.

TF Ops
The Flag Bridge (p. 103).

Navigation
The Navigation Station (p. 118).

Main Guns
The Main Gunnery Station (p. 122).

Sec. Guns
The Secondary Gunnery Station (p. 128).

Torpedoes
The Torpedo Station (p. 132).

Air Ops
The Air Operations Station (p. 138).

Damage
The Damage Control Station (p. 144).

Outside
The Outside Station (p. 154).

Status
The Status Report for the active ship (p. 154).

Ships (Flag Bridge and Action Stations only)

This menu will not be accessible when you are at the Admiralty level. If not playing at this level, it is accessible when you are at the Flag Bridge or one of the Action Stations. It enables you to get intelligence reports on all enemy ships involved in the current engagement. Information reflects the impact of activity and damage in the current engagement, although your knowledge of enemy ships will be less complete than that of friendly ones. This menu also allows you to select a new active ship.

British

This brings up a list of the British ships.

German

This brings up a list of the German ships.

Reports (Admiralty Level only)

This menu will only be accessible when you are at the Admiralty level. It enables you to get a variety of summary reports. Furthermore, by pressing "Alt" and clicking (with the left mouse button) on an item on one of these reports, you can get a more detailed report on that specific item.

Ships

This brings up the All Ships Report. For further information, see "The All Ships Display" in the "Admiralty" section on page 189. "Ctrl"-click on any ship brings up its Status Report; "Alt"-click brings up its Damage Report.

Task Forces

This brings up the Task Force Report. For further information, see the "Task Force Report" in the Admiralty section on page 175. Click on any task force to bring up the Task Force Display for it.

Patrols

This brings up the Patrol Report. For further information, see the "Patrol Report" in the "Admiralty" section on page 179. "Ctrl"-click on any ship brings up its Status Report; "Alt"-click brings up its Damage Report.

Escorts

This brings up the Escort Report. For further information, see the "Escort Report" in the "Admiralty" section on page 183. "Ctrl"-click on any ship brings up its Status Report; "Alt"-click brings up its Damage Report.

Convoys

This brings up the Convoy Report. For further information, see the "Convoy Report" in the Admiralty section on page 186. Click on any convoy to bring up the Convoy Display for it.

Briefings

This menu allows you to access the on-line historical background material. This material can help improve your play while enriching your understanding of the era. For a full discussion, see the "On-Line History: Briefings" section of the "Historical Background" on page 24.

Systems

Describes individual systems aboard ships.

Vessels

Describes different classes of ships.

Operations

Explains how naval war was conducted.

Background

Information about the navies and other topics.

Engagements

Descriptions of the historical battles and campaigns.

COMMANDING A TASK FORCE

While GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 lets you take charge of the action from individual turrets on individual ships all the way up to the Admiralty building, the Flag Bridge is the central station in the game. Ships seldom fought alone, and the Admiral in charge of a task force commanded from this nerve center aboard his flagship. You start each engagement on the Flag Bridge, and whether you are playing an engagement, an operation, or the campaign game, you will almost certainly return here often during the course of play.

THE FLAG BRIDGE

This station contains the instruments that enable you to easily command a group of ships. This is the first station you enter when you start a new engagement, and you can access it by selecting the TF OPS option from the STATIONS pull-down menu.

The Flag Bridge is divided into two major parts: the Tactical Map Display and the Ship Control Area. These two displays together give you information about and control over every major aspect of each ship's activities. In fact, if you choose, you can pretty much run a battle from here (although you will of course miss the immediacy and the fine control offered by moving to the ship's Action Stations).

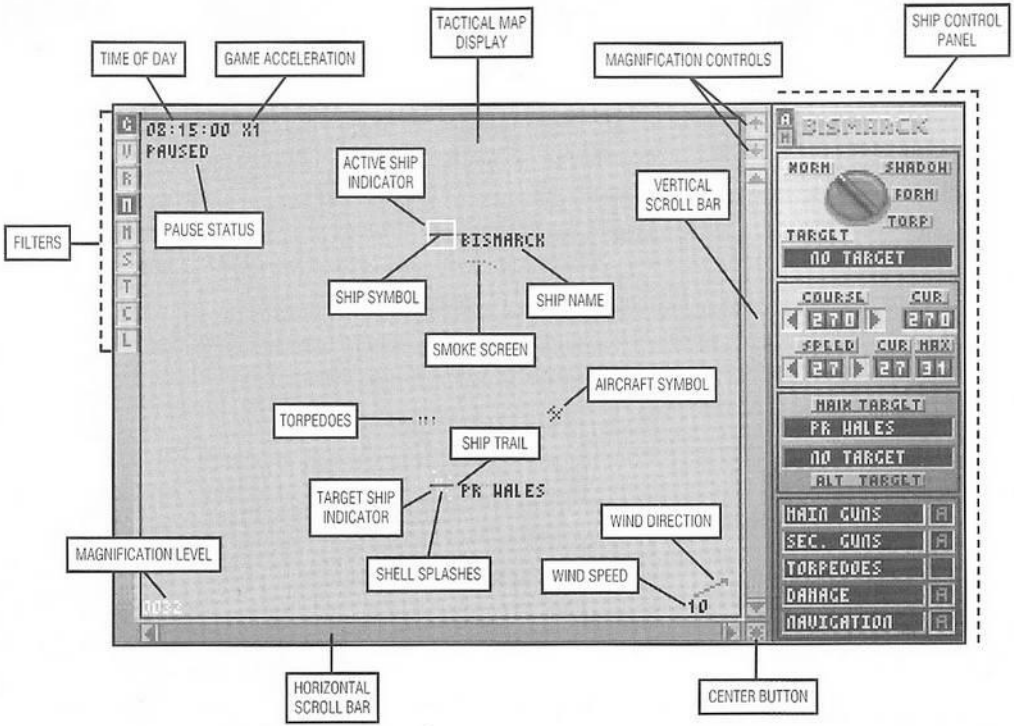
The Tactical Map Display is both a visual reference and a means of issuing certain commands. To help you keep track of the battle, it shows the locations of your own ships, known enemy ships, aircraft, torpedoes, shell splashes, and other features of the battle. Furthermore, there are a number of "filters" you can use to toggle the display of different kinds of useful information. To facilitate input of orders, you can issue certain instructions by pointing and clicking directly on the map, most notably picking a ship to give orders to, and designating targets.

The Ship Control Area contains the instruments you use to issue most of your orders. You can order a ship to adopt a certain course and speed, or tell it to follow another ship. You can specify its gunnery targets or order a torpedo attack. Central to this activity is the question of the ship's Control Mode and the Control Status of its various systems. The Control Mode, set at the top of the display, determines if you can give the ship any orders ("M"), or if it is designated to act autonomously ("A"). The System Control Statuses indicate how particular systems on the ship are being controlled (the exact possiblities of which vary from system to system). These controls take a bit of getting used to, but you will find that they give you tremendous flexibility in controlling your fleet.

The Tactical Map Display

The Flag Bridge makes use of a large version of the Tactical Map Display; a smaller version of it is also found at the Navigation, Main Gunnery, Secondary Gunnery, Torpedo, and Air Operations Stations.

The two maps show exactly the same information and use the same controls. To do so, the small map must squeeze the same amount of ocean as the large one into a considerably smaller area. This means that apparent distances are halved on the small map compared to the one found on the Flag Bridge. For example, if two ships separated by 10,000 yards of water appear to be roughly an inch apart on the Flag Bridge, on the small map, the same two ships will appear to be only one-half inch apart. The best way to see this effect and compensate for it is to use the grid: the lines are always 10,000 yards apart, whatever the level of magnification on whichever map you are looking at.



The Flag Bridge: Tactical Map Display

Mouse Commands

• *"Ctrl"-Left Mouse Button:* Pressing the left mouse button with the "Ctrl" key centers the map at the location of the mouse pointer.

• *"Alt"-Left Mouse Button:* Pressing the left mouse button with the "Alt" key while the pointer is on a ship gives you the Intelligence Report on an enemy ship, or selects a friendly ship.

Ship Symbols

Ship symbols show the current location of a ship. The icons come in three sizes.

• *Battleship:* Largest size.

• *Cruiser/Aircraft Carrier:* Intermediate size.

• *Destroyer:* Smallest size.

Active Ship Indicator

This indicates that it is the vessel currently selected for orders or examination.

Target Ship Indicator

This indicates the current target of the active ship.

Aircraft Symbol

This shows the current location of an airplane.

Ship Trail

Shows the path each ship has taken over the last hour.

Time of Day

Time can be an important factor in a battle. The effects of day vs. night are obvious, but unless you are aware of the time you may be taken by surprise at dusk or dawn. Depending on your ships and your mission, daytime, nighttime, and the times in between can either help or hinder your forces.

Pause Status
This appears if the pause option is selected. Note that you can still use all game controls while the game is paused, so it is a good idea to pause whenever you are considering a major initiative.

Wind Direction
Shows the direction of the prevailing wind. This affects the movement of smokescreens as well as the accuracy of gunnery into the wind in high seas.

Wind Speed
Wind speed is an important factor in a battle, not only because it may preclude air operations, but also because it can tell you where on the Beaufort Scale the weather currently is. Heavy seas can hinder visibility and the accuracy of your weapons, and may even make certain actions impossible. For more information on the Beaufort Scale and weather in general, see "The Environment" in the "Admiralty" section on page 191.

Magnification Controls
The up arrow decreases the magnification of the map (shows a larger area in less detail), while the down arrow increases the magnification (shows a smaller area in greater detail).

Vertical Scroll Bar
This shifts the area displayed on the map up and down (North and South).

Horizontal Scroll Bar
This shifts the area displayed on the map left and right (East and West).

Filters
Each control toggles the associated information displayed on map. In general, it is best to have only one or two of these on at the same time.

- "G" (Grid): The distance between lines equals 10,000 yards.
- "V" (View): Circles show the maximum range of vision from each ship.
- "R" (Radar): Circles show the maximum radar range of each radar-equipped ship.
- "N" (Name): Display of each ship's name adjacent to its location.
- "M" (Main Armament): Circles show the range of each ship's main armament.
- "S" (Secondary Armament): Circles show the range of each ship's secondary armament.
- "T" (Torpedoes): Circles show the range of each torpedo-armed ship's torpedoes. The three concentric circles correspond to the short, medium, and long range settings.
- "C" (Auto-Center): When auto-center is on, the map will be kept centered on a point halfway between the active ship and its target. Note: this auto-center command is very powerful. It overrides map scrolling commands and any attempts to change the outside view.
- "L" (Ship Trail): A line behind each ship shows the course it has taken during the engagement.

Note: ranges for View and Radar are the extreme ranges at which a battleship can be spotted. Smaller ships are harder to detect and may not be spotted until the ship is well within the circle.

Ship Control Area

Name Plaque

The name of the currently active ship is shown here. This ship is also surrounded by a white box on the Tactical Map Display.

Control Mode Selector

This shows whether the currently active ship is under your control ("M" for manual) or the computer's ("A" for auto). You can change it by clicking on the un-highlighted option.

Keep in mind that the "A" setting is very powerful: the ship is totally controlled by the computer in all respects; you can examine but not affect the other controls for this particular ship. The "M" setting, in contrast, is less drastic: it gives you the option of controlling some of the ship's systems in more detail than others. Which systems you control and which the computer controls are shown on the "System Control Selector Panel," described below.

Formation Control Knob

This control enables you to set the active ship's course yourself, or order it into one of three standard maneuvers. If you order it to execute a standard maneuver, you must also specify a "target" via the Formation Target Control described below.

Note: to issue any order through the Formation Control Knob, the Control Mode Selector adjacent to the Name Plaque must be set to "M", or Manual (Player) control. The Navigation System Status Control automatically sets itself.

NORM: The "Normal" mode for controlling the ship. When the knob is set to this mode, you can issue orders via the Course and Speed Controls described below.

SHADOW: The active ship enters the "Shadow" mode, in which it takes up station in relation to a targeted enemy ship. For instructions on specifying a target ship and a station relative to it, see the instructions for the "Formation Target Selector" below.

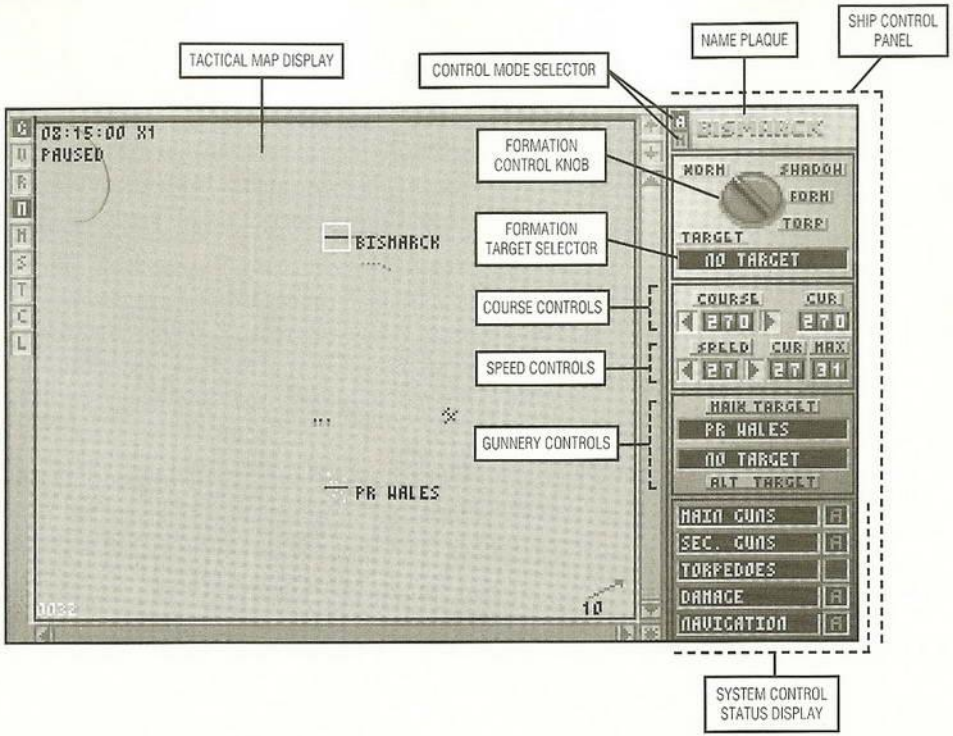
FORM: The active ship takes up and maintains a station relative to a targeted friendly ship. For instructions on specifying a target ship and a station relative to it, see the instructions for the "Formation Target Selector" below.

TORP: The active ship executes a torpedo attack against an enemy target. For instructions on specifying a target ship, see the instructions for the "Formation Target Selector" below.

Formation Target Selector
If you set the Formation Control Knob to SHADOW, FORM, or TORP, you also need to specify a ship as the target, which the active ship uses as a reference in executing the order.

• *Torpedo Attack*
If the Formation Control Knob is set to TORP, you need only specify a target by clicking in the Target Box to find which of the potential targets to attack. The active ship then attempts to execute a torpedo attack against it. *Note: the Torpedo System Status Control automatically sets itself.*

• *Shadow and Formation*
If the Formation Control Knob is set to SHADOW or FORM, you must specify the target by clicking on the Target Box to select the desired target from among the friendly or enemy ships, just as with a torpedo attack. Then, you must also set the position as to where in relation to that target the active ship should position itself.



The Flag Bridge: Ship Control Panel

You specify a position relative to the target ship by using the marker that appears on the map when you select the SHADOW or FORM options on the Formation Control Knob. It appears initially over the Active Ship, but you can change its location by clicking on any point on the map. The ship then attempts to maintain the same position *relative to the target* that the designated point has at the moment it is designated. For example, if you place the marker 5,000 yards behind the target ship, the active ship attempts to move to a position 5,000 yards behind the target as quickly as possible, and then follows its every move while remaining 5,000 yards behind.

It is important to keep in mind that so long as the Formation Control Knob is set to SHADOW or FORM, the location of the marker changes every time you click on the screen, so long as the active ship remains active. These two options give you a tremendous ability to coordinate the movements of your ships with each other and with the enemy, but such power necessitates that you take great care.

Course Controls

These controls show the ship's current and desired course, and allow you to change them *if the Control Mode Selector is set to "M" (Manual) and the Formation Control Knob is set to NORM. The Navigation System Status Control automatically sets itself.*

CUR: Shows the current heading of the active ship.

COURSE: This readout shows the desired course for the active ship. To change the desired course to the left (relative to the ship's current course), click on the left arrow; to change the desired course to the right (of its current course), click on the right arrow. *Note: The arrows will only have an effect if the Control Mode Selector is set to "M" (Manual), the Formation Control Knob is set to NORM,* ***and*** *the Navigation System Status Control is set to "A".*

Speed Controls
These controls show the ship's current and desired speed, and allow you to speed up or slow down the ship *if the Control Mode Selector is set to "M" (Manual) and the Formation Control Knob is set to NORM.*

MAX: Shows the active ship's maximum speed.

CUR: Shows the active ship's current speed.

SPEED: Shows the active ship's desired speed. To increase it (up to the ship's maximum), click on the right arrow. To decrease it (down to 0), click on the left arrow.

Gunnery Controls
These controls enable you to designate targets for the active ship's guns. *Note: These controls only work if the Control Mode Selector adjacent to the Name Plaque is set to "M" (Manual). The Main Guns System Status Control automatically sets itself.*

MAIN TARGET: Names the enemy ship that is currently the primary target of the active ship's guns. The active ship fires a broadside if possible; otherwise it fires with any turrets that can be brought to bear.

ALT TARGET: Names the ship that is currently the secondary target of the ship's guns, which will be attacked if some or all of the guns cannot attack the main target. Hence, it is best to designate an alternate target that is widely separated from the main target, since it will *only* be attacked when some of the active ship's turrets both *cannot* hit the main target and *can* hit the alternate.

System Control Status Display
Indicates the control status of each of the major systems of the active ship. Each system is set to either "A" (Automatic) or "M" (Manual). What each status means varies from system to system.

• *MAIN GUNS*
"A": The AI attempts to engage the target(s) designated by the Gunnery Controls. Any previous input through the separate Main or Secondary Gunnery Stations is ignored.

"M": The ship ignores the target(s) designated by the Gunnery Controls, and follows your input from the Main Gunnery Stations instead.

• *SEC. GUNS*
"A": The AI selects targets and fires the secondary guns.

"M": The secondary guns fire according to your input through the Secondary Gun Station.

• *TORPEDOES*
"A": The ship executes an automatic torpedo attack if so ordered via the Formation Control Knob and Formation Target Selector on the Flag Bridge.

"M": The ship will not execute an automatic torpedo attack, but instead follows instructions given through the Torpedo Station.

• *DAMAGE*
"A": The AI allocates damage control parties, and will not accept player input. If you select this option after you have allocated some damage control parties via the Damage Control Station, the computer may well override your orders and redistribute them.

"M": The AI will not allocate damage control parties, relying instead on you to do so.

• *NAVIGATION*
"A": The ship follows the instructions given via the Course and Speed Controls on the Flag Bridge.

"M": The ship follows instructions given via the Navigation Station.

COMMANDING A SHIP

While the Flag Bridge is a convenient place from which to command all your ships, you will find much of the excitement and challenge of naval command aboard the vessels themselves. Here, you can see the fleets in action first hand, and make the critical decisions that will spell the difference between victory and defeat. Set up the battle from the Admiral's cabin, but then transport yourself into the thick of the action to get the real feel of GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43!

COMMON SCREEN ELEMENTS

Certain displays are employed at a number of stations. Rather than being described repeatedly in the discussions of the different stations, they are grouped here.

SHIP STATION CONTROL MODE SELECTOR

This Selector resembles the Control Mode Selector on the Flag Bridge (illustrated on page 111), but instead of setting whether you or the computer is controlling the ship as a whole, it sets whether you can change this specific system's controls at this Station ("M" for Manual), or whether this system is controlled by the orders given at the Flag Bridge ("A" for Automatic). Note that for each station the Ship Station Control Mode Selector setting corresponds exactly to the System Status setting on the Flag Bridge.

You can change this setting simply by clicking on whichever choice is currently not selected. If you want to issue orders you *must* set this selector to "M". If it is currently set to "M" and you set it to "A", the system will remain inactive until you return to the Flag Bridge and give it orders (or turn the ship as a whole over to computer control via the Flag Bridge's Control Mode Selector).

Note that the "A" setting is very powerful; you can examine but not affect the other controls for this particular Station.

THE TACTICAL MAP

For a description of the information shown and control mechanisms used by the Tactical Map, see "The Flag Bridge/The Tactical Map" above, page 103.

The Binocular View

View Bearing Indicator
This indicates the direction in which the binoculars are pointed. You can change the view to a specific bearing by clicking on its tick mark.

View Left Arrow
This moves the direction of the view to the left.

View Right Arrow
This moves the direction of the view to the right.

Increase Magnification
This makes objects in the binoculars appear larger while decreasing the field of vision.

Decrease Magnification
This makes objects in the binoculars appear smaller while increasing the field of vision.

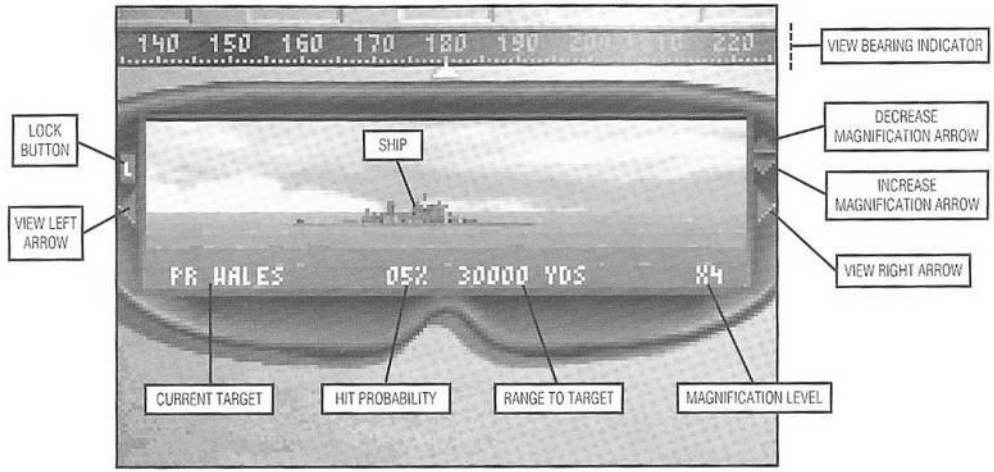
Lock Button
This button locks the outside view on the designated target. Selecting this option disables the View Arrows and View Bearing Indicator.

Outside View Target Selection
You can designate a target by clicking on the binocular view and then selecting from the menu that appears.

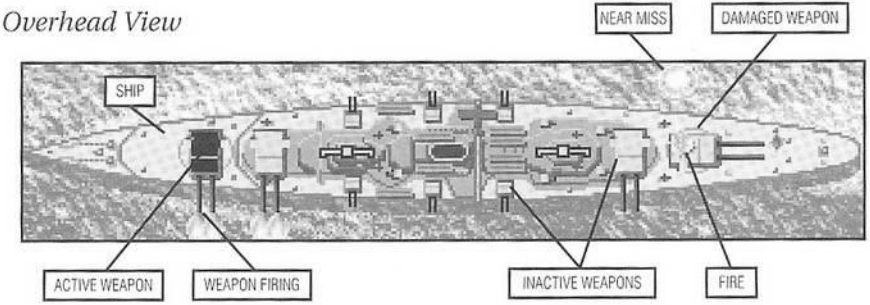
The Overhead View

The Overhead View shows a top-down view of the active ship. It is used mainly for illustrative purposes, showing the orientation and firing of the main and secondary guns and torpedo tubes, the splash of near misses, and graphic evidence of the damage sustained by the ship. In addition, certain stations make use of the Overhead View for inputting instructions; these instances are discussed in the appropriate sections below.

The Binocular View



The Overhead View



While the Flag Bridge enables you to direct the activities of the ships under your command in a general way, the Ship Stations give you the ability to control the detailed actions of every ship under your command.

NAVIGATION

This Station contains the instruments that control a ship's direction and speed. You can access it by selecting the NAVIGATION option from the STATIONS pull-down menu.

The Navigation Station is divided into three major parts: the Bridge View, the Tactical Map Display, and the Navigation Controls.

Bridge View

• *Increase Magnification*
This makes objects appear larger while decreasing the field of vision.

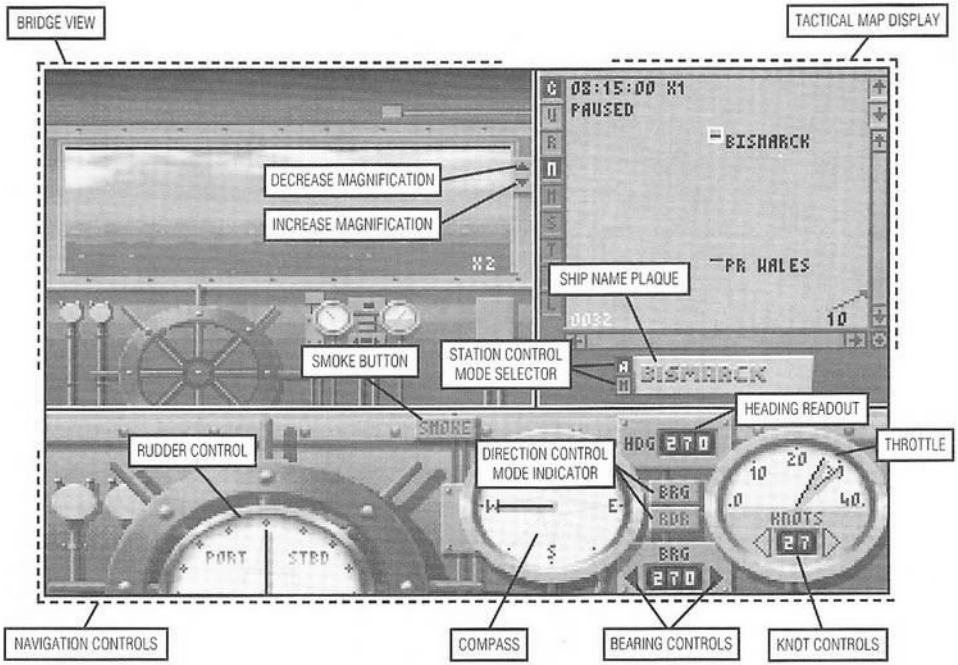
• *Decrease Magnification*
This makes objects in the binoculars appear smaller while increasing the field of vision.

Tactical Map Display

The Navigation Station makes use of the Tactical Map Display, described on page 104. In addition, two other elements are included as part of the Tactical Map Display on this screen.

• *Name Plaque*
The name of the currently active ship is shown here.

• *Station Control Status Selector*
This controls whether the Station's instruments are controlled via this Station or the Flag Bridge. Remember that this Selector *must* be set to "M" for you to be able to set any of the controls here. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115.



The Navigation Station

Navigation Controls

These instruments enable you to take control of the ship's course and speed. You can control the course in one of two ways. You can indicate on the compass or through a digital readout the course you want the ship to follow (BRG mode) or you can actually set the rudder (RDR mode) and then straighten it when the proper course is reached. The speed controls enable you to set the ship's desired speed, while showing both its current speed and the maximum speed it can attain. Together, these navigation controls put you in complete control of the ship's movements.

• *Direction Control Mode Selector*

This indicates whether ship's navigational systems are currently controlled by the Bearing Controls or Compass (BRG), or directly by the rudder setting (RDR). To change modes, click on the desired one.

• *Heading Readout*

This gives the direction in degrees the ship is currently pointing.

• *Bearing Controls*

The digital readout gives the direction in degrees of the desired heading. To change the desired heading, click on the arrow to the left of the readout to change the desired heading to the left (port); click on the arrow to the right of it to change the desired heading to the right (starboard). Note: (1) the Navigation Control Mode Selector must be set to BRG for these controls to work, and (2) *the ship will start to turn at the gentlest rate in the shortest direction to the new bearing. You may change the setting on the Rudder Control to tell the ship* ***which way*** *to turn, to the right or the left, the "long" or the "short" way around, and how sharp the turn will be.*

• *Compass*
This shows the ship's current heading and can also be used as an alternative to the Bearing Controls. Simply click on the desired heading.

• *Rudder Control*
The Rudder Control is used in two ways:

(1) When the Navigation Control Mode Selector is set to BRG, or Bearing/Compass Control, click on the rudder after setting a new course in order to tell the ship which of the two possible ways to turn if you want to change the default direction and sharpness.

(2) When the Navigation Control Mode Selector is set to RDR, the ship turns in the direction to which it is set until it is centered or set to the opposite direction (in other words, the ship will travel around in a circle if this control is left on). When the rudder is set to "Port" the ship turns to the left; when set to "Starboard" the ship turns to the right. You can specify three degrees of sharpness in either direction by clicking on the corresponding point along the wheel. The points closest to the center and top are the gentlest and the ones farthest and lowest are the sharpest. The gentle degrees of rudder do not affect gunnery, but the intermediate ones degrade it markedly, and the sharpest degree in either direction precludes it altogether.

• *Smoke Button*
Press this to create a smoke screen. Smoke is primarily used to obscure the enemy's view of a weaker or damaged vessel as it retreats. Remember that smoke drifts in the direction the wind is blowing, and if the wind is strong, the smoke screen will be ineffective.

• *Throttle*
This control is used to show the ship's speed. The red line indicates the ship's top speed, and the black line shows the current speed.

• *Knot Controls*
This is an instrument designed to set the ship's speed. The digital readout shows the ship's desired speed. To increase the ship's speed, click on the right arrow; to decrease it, click on the left arrow. Each click or key press changes the desired speed by one knot.

The Main Gunnery Station

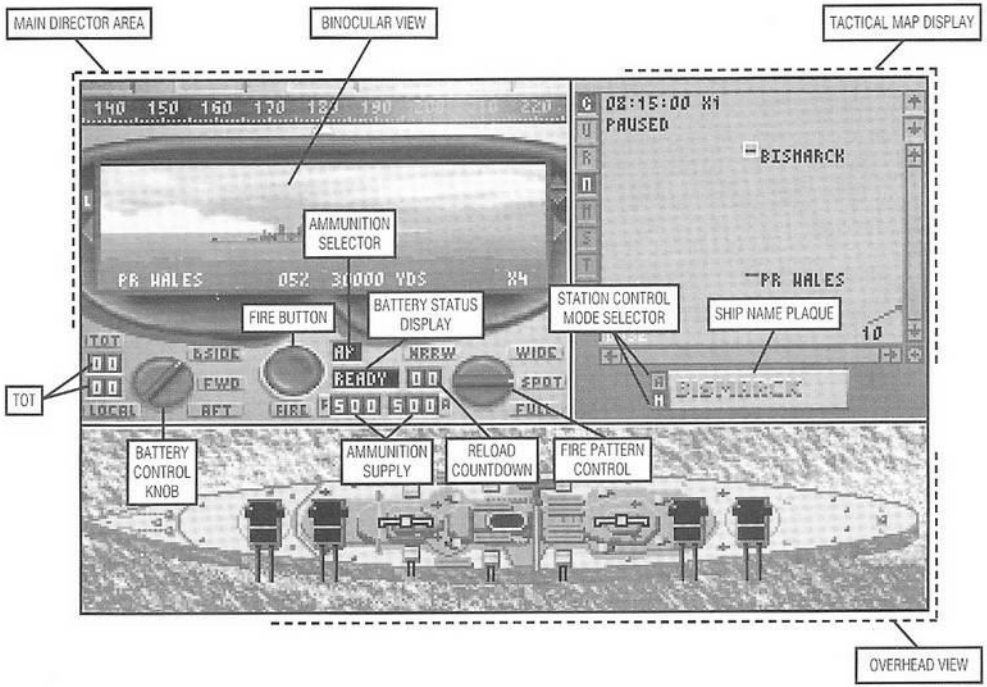
This Station contains the instruments that control a ship's big guns. You can access it by selecting the MAIN GUNS option from the STATIONS pull-down menu. Note that destroyers do not have a Main Gunnery Station in the game (all their guns are considered secondary armament).

The Main Gunnery Station is divided into three major parts: the Tactical Map Display, the Main Director, and the Overhead View.

Tactical Map Display

The Main Gunnery Station makes use of the Tactical Map Display, described on page 104. In addition, two other elements are included as part of the Tactical Map Display on this screen.

• *Name Plaque*
The name of the currently active ship is shown here.



The Main Gunnery Station

• *Station Control Status Selector*
This controls whether the Station's instruments are controlled via this Station or the Flag Bridge. Remember that this Selector *must* be set to "M" for you to be able to set any of the controls here. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115.

Main Director
The Main Director Area contains the instruments with which you control the ship's main armament. Hitting a target at a range of up to twenty miles is not a trivial task, and requires some understanding of how gunnery works. Basically, the gunnery director staff makes its best guess (fire control solution) of where to aim from the bearing of the target, the range indicated by the rangefinding equipment (optical and, if available, radar), and observation of its course and speed. The guns then fire spotting rounds, whose splashes are observed and used to make corrections before firing again. This process continues until the splashes "bracket" the target, which means some are in front of it, while others are behind it. Once this has been achieved, the guns can switch to full fire, although a return to spotting fire may be necessary occasionally as the target moves away from the bracketed position.

At long range, even an accurate fire control solution may yield only 15% hits. There are many factors affecting accuracy: the shear range (the longer the range, the more impact even small inaccuracies make), time in flight (it takes a full minute for a shell to travel 30,000 yards, during which time the target will have moved), the size, speed, and maneuverability of the target ship, the amount of time the target has been tracked, waves, wind, weather, light conditions, the quality of the firing ship's crew,

rangefinding equipment and guns, whether or not the firing ship is itself under fire, and the number of ships firing at the target (more than one makes it hard to keep track of spotting rounds).

To maximize your chances of hitting the enemy from this station, remember to use the maximum number of guns you can (broadside if possible), use the spotting fire option initially, and then decide between a normal, a wide, or a narrow spread when you go to full fire. Also, remember to fire the right kind of ammunition; armor-piercing against battleships, and high-explosive against almost everything else.

• *Binocular View*
The Main Director includes the Binocular View so you can see the ships with which you are fighting. The Binocular View information and controls are described on page 116. Keep in mind that you can designate a target by clicking in the viewing area, and that at this Station (only) the Binoculars display a number giving the probability of hitting the designated target, along with the standard information about the magnification level, target name, and range.

• *Battery Control Knob*
This knob selects the active set of guns, or battery.

BSIDE: Selects broadside mode, or all guns in all turrets. This mode gives the best chance of getting a hit. This selection cannot be chosen if *both* of the Main Fire Directors are damaged.

FWD: Selects forward turret(s) only.This selection cannot be chosen if the Forward Fire Director is damaged.

AFT: Selects aft turret(s) only. This selection cannot be chosen if the Aft Fire Director is damaged.

LOCAL: Sets turrets to local control, in which each fires on its own. This mode gives the worst chance of getting a hit, and is usually used only when damage to the directors renders them inoperative.

Note that when switching from a less inclusive battery to a more inclusive one (like from LOCAL to BSIDE), there may be a considerable delay in the response to your orders, since the battery must wait for the least prepared guns to become ready before firing. This may even involve waiting for a set of guns to finish reloading, fire according to its previous orders, and then reload again!

• *TOT — Time on Target*
TOT stands for Time on Target, or time remaining until shells in the air hit. Two numbers can be displayed, showing the time remaining for the last two sets of shells. Because of the physics involved, main guns will never have more than two sets of shells in the air at a time.

• *FIRE*
This toggles the "Hold" fire order for the currently active battery. If the order is *not* "Hold", then the battery continues to fire and reload as long as the target is in range.

• *Battery Status Display*
This shows the status of the active battery.

HOLD: The battery remains trained on the current target ready to fire, but will not fire until the Fire button is pressed.

READY: The battery is loaded and will fire as soon as a target is acquired.

FIRING: The battery is in the process of firing.

RELOAD: The battery is in the process of reloading, and will fire as soon as the guns are loaded.

• *Reload Countdown Display*
This shows the time remaining before the active battery will be ready to fire again.

• *Ammunition Supply:*
The readout labeled "F" shows the ammunition left available to forward turrets, while the readout labeled "A" shows the ammunition left available to aft (rear) turrets.

• *Fire Pattern Control Knob*
This knob sets the specific fall of shot desired.

SPOT: The normal pattern used when first firing on a target. The guns only fire a second time after their splashes have been observed and their aim corrected.

FULL: The normal pattern used once the target has been acquired. All guns in the active battery fire, and continue firing as rapidly as they can be reloaded, with a normal spacing of shells falling on the target.

WIDE: A pattern used when a hit is needed as soon as possible. The gun tubes are angled so that the shells fall over a larger area than normal, which increases the probability of a hit on an imperfectly acquired target. However, the chance of multiple hits is sharply reduced.

NRRW: A pattern used when multiple hits are desired. The gun tubes are angled so that the shells fall over a smaller area than normal, which increases the probability of multiple hits. However, it increases the chance of a total miss as well, and so is best used against a solidly acquired target.

• *Ammunition Selector*
This readout shows which of the two types of ammunition the active guns are using. The type can be toggled by clicking on the readout itself. The two types are:

AP: Armor-piercing shells for use against heavily armored targets, primarily battleships.

HE: High explosive shells for use against unarmored and lightly armored targets, which includes most ships besides battleships. This ammunition can also cause problems for battleships by damaging vulnerable parts of the superstructure and starting fires.

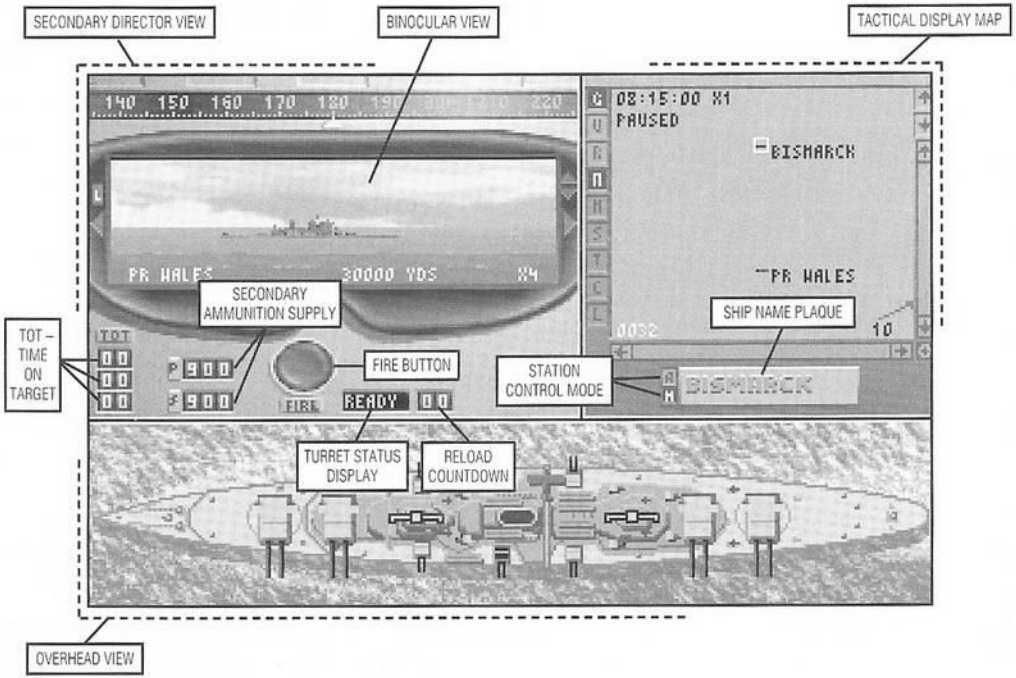
Overhead View
This display shows a bird's-eye view of the active ship, with the active battery highlighted. The general features of this view are described in "The Overhead View," on page 116.

This view does have one control function at the Main Gunnery Station. When the Battery Control Knob is set to Local Mode, you make a turret active by clicking on it here. Otherwise, the view's purpose is purely to illustrate the action.

Secondary Gunnery

This Station contains the instruments that control a ship's Secondary Armament. You can access it by selecting the SEC. GUNS option from the STATIONS pull-down menu. Note that cruisers and some battleships do not use the Secondary Gun Station in the game (all their smaller guns are really for anti-aircraft purposes), while destroyers may *only* use this Station.

The Secondary Gunnery Station is divided into three major parts: the Tactical Map Display, the Secondary Director, and the Overhead View.



The Secondary Gunnery Station

Tactical Map Display
The Secondary Gunnery Station makes use of the Tactical Map Display, described on page 104. In addition, two other elements are included as part of the Tactical Map Display on this screen.

• *Name Plaque*
The name of the currently active ship is shown here.

• *Station Control Status Selector*
This controls whether the Station's instruments are controlled via this Station or the Flag Bridge. In the case of the Secondary Gunnery Station, if this Selector is set to "A", the computer fully controls all secondary guns. If, on the other hand, it is set to "M", you must direct the fire of each of the secondary guns yourself. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115.

Secondary Director
The Secondary Director Area contains the instruments with which you can monitor and control the ship's secondary armament. Since the purpose of secondary guns is basically to ward off smaller craft, secondary guns are designed for rapid fire along a relatively flat trajectory, avoiding the complex calculations and iterations of spotting fire necessary for the main guns. Hence, firing the secondary guns is far simpler than firing the main guns. However, there are usually a lot of them, and the AI is likely to be quicker than you in controlling them. The secondary gunnery screen is a good place to view the battle, but it is often a poor place to try and exercise control.

• *Binocular View*
The Secondary Director includes the Binocular View so you can see the ships with which you are fighting. The Binocular View information and controls are described on page 116. Keep in mind particularly that you can designate a target by clicking in the viewing area.

• *TOT — Time on Target*
TOT stands for Time on Target, or time remaining until shells fired by the active turret hit. Three numbers can be displayed. Because of the physics involved, there can never be more than three shots in the air at once.

• *Secondary Ammunition Supply*
The readout labeled "P" is the ammunition remaining for the port (left) turrets (or "F" for the forward turrets in destroyers). The readout labeled "S" is the ammunition remaining for the starboard (right) turrets (or "A" for the aft turrets in destroyers).

• *FIRE*
This toggles the HOLD fire order. If the gun's orders are not to HOLD fire, then it will fire and reload continuously as long as the target is in range.

• *Turret Status Display*
This is the status of the active turret.

HOLD: The turret will remain trained on the current target, ready to fire, but will not fire until the Fire Button is pressed.

READY: The turret is loaded and will fire as soon as a target is acquired.

FIRING: The turret's armament is in the process of firing.

RELOAD: The turret is in the process of reloading, and will fire as soon as the reload is completed.

• *Reload Countdown*
This is the number of seconds before the active turret is ready to fire.

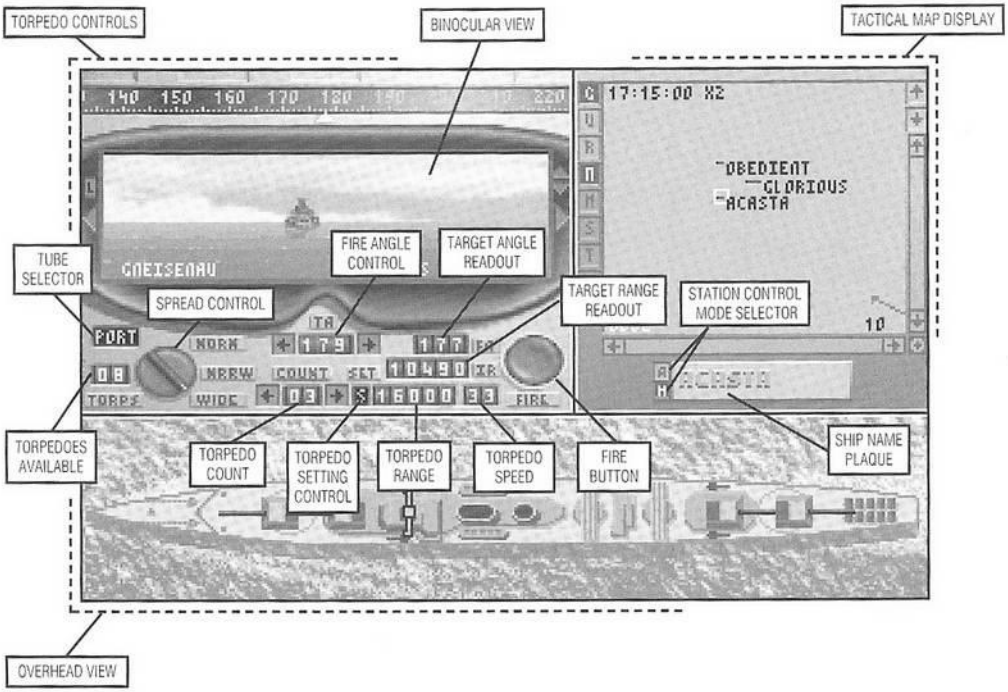
Overhead View
This display shows a bird's-eye view of the active ship, with the active turret highlighted.

This view has an important control function at the Secondary Gunnery Station; you make a turret active by clicking on it here. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115.

Torpedo Station

This Station contains the instruments that control a ship's Torpedo Tubes. You can access it by selecting the TORPEDOES option from the STATIONS pull-down menu. Note that not all ships have torpedoes.

The Torpedo Station is divided into three major parts: the Tactical Map Display, the Torpedo Controls, and the Overhead View.



The Torpedo Station

Tactical Map Display
The Torpedo Station makes use of the Tactical Map Display, described on page 104. In addition, two other elements are included as part of the Tactical Map Display on this screen.

• *Name Plaque*
The name of the currently active ship is shown here.

• *Station Control Status Selector*
This controls whether the Station's instruments are controlled via this Station or the Flag Bridge. Remember that this Selector *must* be set to "M" for you to be able to set any of the controls here. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115.

Torpedo Controls
The Torpedo Control Area contains the instruments with which you control the ship's torpedo tubes. Torpedoes are very powerful weapons, delivering a massive charge below the target's waterline, but they move very slowly and therefore are very tricky to use effectively. Fortunately, you have analog computers available to help you make the necessary calculations. To launch torpedoes, you first want to get as close to the target as you can (with their short range, high speed settings are much more accurate than the longer ones). Next, make sure that the tubes on the target's side of your ship are active (big ships had two sets of tubes, one per side). Set the spread to reflect your confidence in your aim, check the computer's suggested angle of fire (it will not be toward the enemy, because if you fire at him, he will be gone when the "fish" arrives), make any corrections you think anticipate the target's probable

maneuvers (he may turn toward you once he sees the torpedo coming), and then fire. It is, once again, a tricky business, one you will probably have to practice before you get it right.

• *Binocular View*
The Torpedo Controls include the Binocular View so you can see the ship you are attacking. The Binocular View information and controls are described on page 116. Keep in mind that you can designate a target by clicking in the viewing area.

• *Tube Selector*
Click on this readout to toggle control between the PORT and STBD (Starboard) tubes. Note that these settings include all tubes that can *bear* on one side or the other, which means that centerline-mounted tubes will be counted in both. The currently selected tubes are the active tubes.

• *Torpedoes Available*
This shows the total number of torpedoes available in the active tubes.

• *Spread Control*
Sets the distance between the torpedoes as they move toward the target.

NORM: Normal distance between torpedoes.

NRRW: Less distance than normal between the torpedoes. Used when aim is particularly reliable, or need for multiple hits is great.

WIDE: More distance than normal between torpedoes. Used when aim is particularly uncertain, or against multiple ships with overlapping profiles.

• *Torpedo Count*
This readout shows the number of torpedoes to be launched. To increase the number, click on the right arrow; to decrease the number, click on the left arrow. The maximum number that can be launched is the number of active tubes (all tubes on the currently selected side of the ship).

• *Fire Angle Control*
This readout shows the bearing at which the active tubes are pointed. To point them more to the left, click on the left arrow; to point them more to the right, click on the right arrow. Note that the tubes almost certainly should not be pointed at the target itself, since torpedoes move quite slowly relative to the movement of the ships. Instead, they should point to the probable intercept point, the point at which the torpedo will meet the target if it continues its present course and speed.

• *Target Angle Readout*
This is the computer's estimate of the best fire angle, based on a projection of the target's current heading and speed. It is a good place to start your own aiming, but you must judge how the target may change his course, either as part of his normal precautionary maneuvers, or in direct reaction to your torpedo attack.

• *Target Range Readout*
This is the computer's estimate of the range to the target at the projected fire angle.

• *Torpedo Setting Control*
This control shows and enables you to set the range and speed of the active torpedoes. The computer's choice is set initially, but you can choose from among the possible settings for yourself by clicking on the readout. Note that some ship's torpedoes only have one setting.

SHORT: The torpedoes are set to run at maximum speed for a short distance. This setting gives the greatest probability of a hit.

MEDIUM: The torpedoes are set to run at a somewhat slower speed for a somewhat greater distance. This setting gives a somewhat lower probability of a hit.

LONG: The torpedoes are set to run at a slow speed for a long distance. This setting gives little likelihood of a hit.

• *Torpedo Range*
This is the maximum distance the torpedoes will run at the current setting.

• *Torpedo Speed*
This is the speed at which the torpedoes will run at the current setting.

• *Fire Button*
Press this button to launch the torpedoes!

Overhead View
This display shows a bird's-eye view of the active ship, with the active tubes highlighted. This view is not used for any controls at this Station, but it does illustrate the action as the torpedoes are launched. The general features of this view are described in "The Overhead View" on page 116.

Air Operations Station

This Station contains the instruments that control a ship's aircraft. You can access it by selecting the AIR OPS option from the STATIONS pull-down menu. Note that many cruisers and most battleships carry a few scout aircraft, while destroyers have none. Aircraft carriers, of course, have many aircraft, including scouts, torpedo bombers, and fighters. However, only the first two are represented in the game, because fighters could not effectively attack ships and air-to-air combat never played a role in the great battles in the Atlantic in World War II (the Germans had no aircraft carriers and the British avoided coastal waters with their capital ships).

The Air Operations Station is divided into three major parts: the Tactical Map Display, the Aircraft Controls, and the Overhead View.

Tactical Map Display

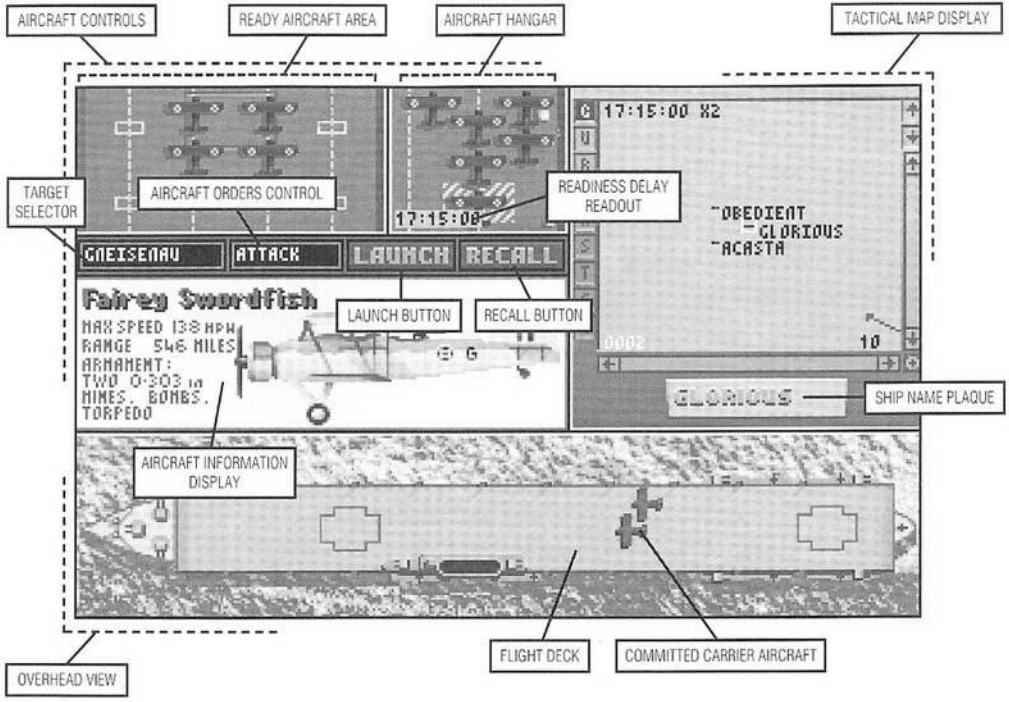
The Air Operations Station makes use of the Tactical Map Display, described on page 104. In addition, one other element is included as part of the Tactical Map Display on this screen.

- *Name Plaque*

The name of the currently active ship is shown here.

- *Station Control Status Selector*

This control is *not* included at this Station, since you must direct all air operations by your side.



The Aircraft Operations Station (Carrier)

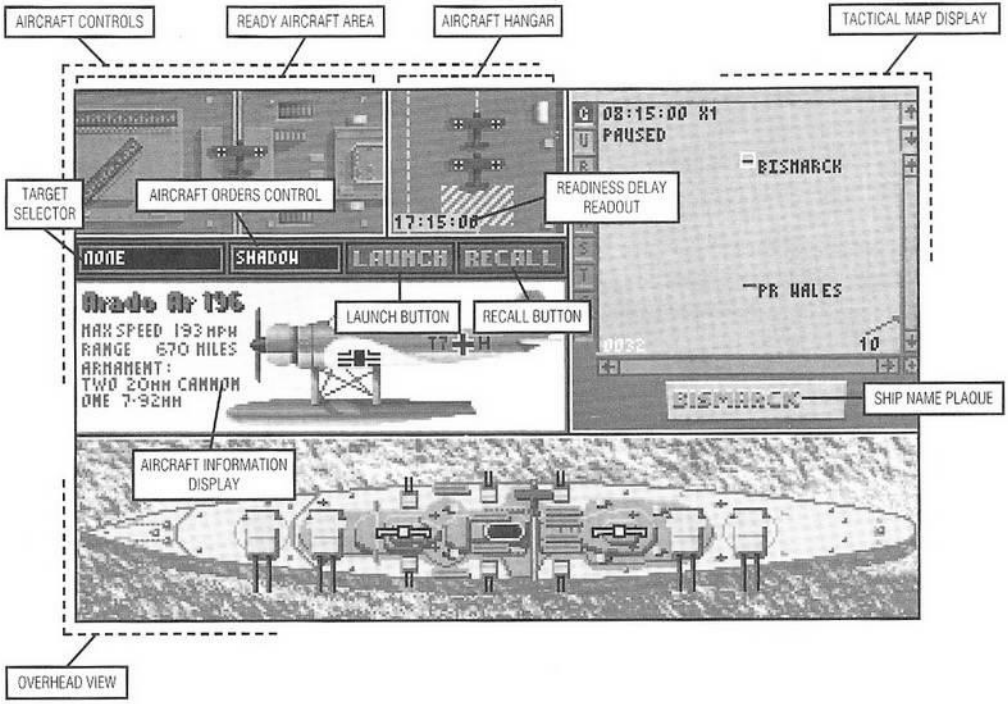
Aircraft Controls

The Aircraft Control Area contains the instruments with which you give orders to the ship's aircraft. There are basically two steps to launching a float plane from a battleship or cruiser catapult and three to launching aircraft from an aircraft carrier. In both cases the first is for the aircraft to move from the Hangar Area to the Ready Area (which takes about 20 minutes!). Once in the Ready Area, a float plane can simply be given a target (a ship to shadow) and launched. Planes on an aircraft carrier, in contrast, can be given orders to either shadow or attack a target, must move from the Ready Area to the Flight Deck, and can only then be launched. Once airborne, all aircraft proceed to their target and carry out their orders (either shadowing it or attacking it), and then return to be recovered automatically.

One other difference between float planes and carrier aircraft is their effect on the game. Float planes not only carry out general reconnaissance, spotting enemy ships over a wide area, but also enhance the gunnery of their mother ship. Carrier reconnaissance aircraft, in contrast, can only conduct general reconnaissance (they weren't trained or equipped to work with shipboard gunnery crews). Strike aircraft will spot enemy ships they fly near, but their main purpose, of course, is to attack on their own.

• *Aircraft Hangar*

This contains aircraft that are not ready to launch nor are in the air. They automatically begin preparing for launch as soon as currently ready aircraft vacate the Ready area.



The Aircraft Operations Station (Battleship)

• *Readiness Delay Readout*
This shows the time remaining before the aircraft currently in the hangar will be ready, if in the process of getting ready (i.e., if the Ready Area is currently empty, if the ship is a cruiser or battleship, or if it is not filled to capacity (12 planes) if it is a carrier). Note that *any* air operations (except launching planes from the flight deck) will cause this countdown to start over (launching simply suspends preparation until all committed aircraft have been launched)! Aircraft typically require about 20 minutes to become ready if uninterrupted.

• *Ready Aircraft Area*
Aircraft shown here are ready for action. For a float plane on a battleship or cruiser, this means that it can be launched by means of the Launch Button at any time. For carrier aircraft this means that they can be moved to the flight deck. To move a carrier plane to the flight deck, simply click on the aircraft and it disappears from the Ready Area and appears on the Flight Deck (to return one that is currently on the flight deck to the Ready Area, click on it as well, and it returns).

• *Aircraft Target Selector*
This control enables you to pick targets for aircraft that are ready to launch. Simply click on the readout or on the Tactical Map.

• *Aircraft Orders Control*
This readout shows the orders being given to the plane that is ready or is preparing to launch. To cycle through the possible orders, press the Aircraft Orders Control Box. The possible orders are:

SHADOW: The plane will attempt to maintain visual contact with the target.

ATTACK: The plane will attempt to damage or sink the ship.

• *Launch Button*
If the ship is a battleship or cruiser, the plane currently in the Ready Area will take off. If the ship is an aircraft carrier, the planes currently on the flight deck will take off, at roughly 15-second intervals.

• *Recall Button*
This button recalls *all* of the airplanes from the active ship. The airplanes will fly back to the ship and land as soon as they are able.

• *Aircraft Information Display*
This shows a picture of the plane that is currently ready for or preparing to launch, along with its name, speed, range, and armament.

Overhead View
This display shows a bird's-eye view of the active ship. If it is a cruiser or battleship, the plane is visible on the catapult if it is ready but unlaunched. If the ship is an aircraft carrier, any committed aircraft will be visible on the flight deck. The general features of this view are described in "The Overhead View" on page 116. Note that it does serve one control function if the ship is a carrier; committed planes can be returned to the Ready Area by clicking on them.

Damage Control Station

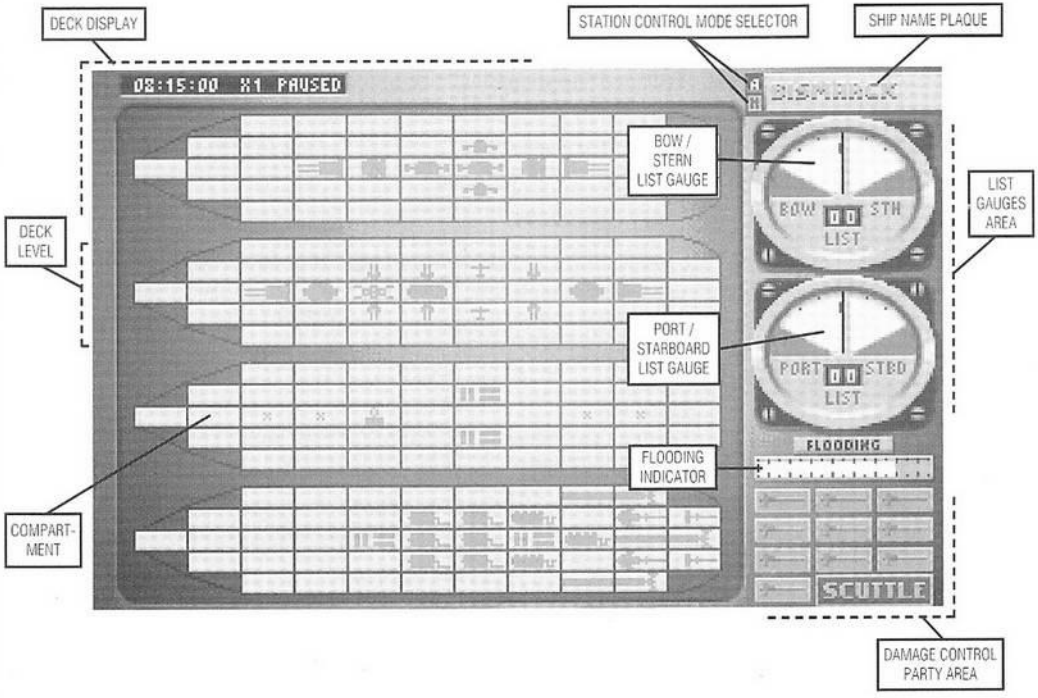
This Station shows damage sustained by the ship and any damage control efforts currently underway. It also gives you control over damage control parties. You can access it by selecting the DAMAGE option from the STATIONS pull-down menu.

The Damage Station is divided into three major parts: List Gauges, the Deck Display, and the Damage Control Parties Area.

Damage

Ships can be damaged in four ways: shell hits, torpedo hits, bomb hits, and collisions with other ships. All can damage or destroy ships' equipment and (if the damage occurs below the waterline) cause flooding. Damage to ships can also start fires which can spread causing even more damage and destruction.

Ship System Icons:



The Damage Control Station

• *Flooding and Counterflooding*
Flooded compartments cause the ship to list in the direction of the flood; if too much flooding occurs on one side of the ship, the ship will capsize. Capsizing was the most common cause of ship sinkings in WWII. Flooded compartments are unusable until the leak has been plugged and the water pumped out. While a compartment is flooded it cannot catch fire. The flooded compartment may be damaged or destroyed by the flooding. The greater the list the more pronounced the negative effects upon gunnery and steering become; at lists above 15 degrees the main guns may not fire at all.

In order to counter a dangerous list caused by flooding the player may use counter-flooding to bring the ship back to an even keel. The disadvantage of this is that if enough water is taken on, the ship will sink anyway; thus this must be used with caution. The area counterflooded suffers the same effects as normal flooding.

• *Fire*
Fires progressively damage and destroy the ship's equipment. The fire may burn out or grow in strength and spread to adjacent compartments (including up and down). The most dangerous aspect of fires is that if a fire spreads to a magazine it will probably blow up the ship. It may even be worth counterflooding a magazine if fire breaks out in an adjacent area.

List Gauges
The list gauges show the degree to which the ship is leaning to one side or another, and to the front or to the back. A mild list affects the ship's speed, steering, and fighting ability; a severe list can cause the vessel to capsize.

• *Name Plaque*
The name of the currently active ship is shown here.

• *Station Control Status Selector*
This controls whether the Station's instruments are controlled via this Station or the Flag Bridge. In the case of the Damage Control Station, if this Selector is set to "A", the computer will fully control all damage control activities. If, on the other hand, it is set to "M", then you must direct all damage control activities yourself. For a full discussion, refer to "Ship Station Control Mode Selector" on page 115. Please note that if you switch from "M" to "A", the computer will probably revise your decisions!

• *Bow/Stern List Gauge*
This indicates the degree of list toward the front (BOW) or back (STERN) of the boat.

• *Port/Starboard List Gauge*
This indicates the degree of list toward the port or starboard.

• *Flooding Indicator*
Indicates the amount of excess water in damaged compartments relative to the ship's flotation ability. If the indicator moves into the red zone, the ship is in danger of sinking.

• *Counterflooding*
To counteract a dangerous list, you can attempt counterflooding, which is deliberately letting water into compartments on the high side of the ship. The ship will settle deeper into the water, but the danger of capsizing will be lessened. Of course, be aware that if the ship settles too far while upright, it will founder and sink in this manner!

To counterflood a compartment, you must click on it to call out the detailed report. Then click on the Counterflood Icon, and the compartment fills with water.

Deck Display

• *Deck Levels*
Each ship is composed of four deck levels, from top to bottom:

(1) Superstructure
(2) Main Deck
(3) Waterline (Belt)
(4) Below water

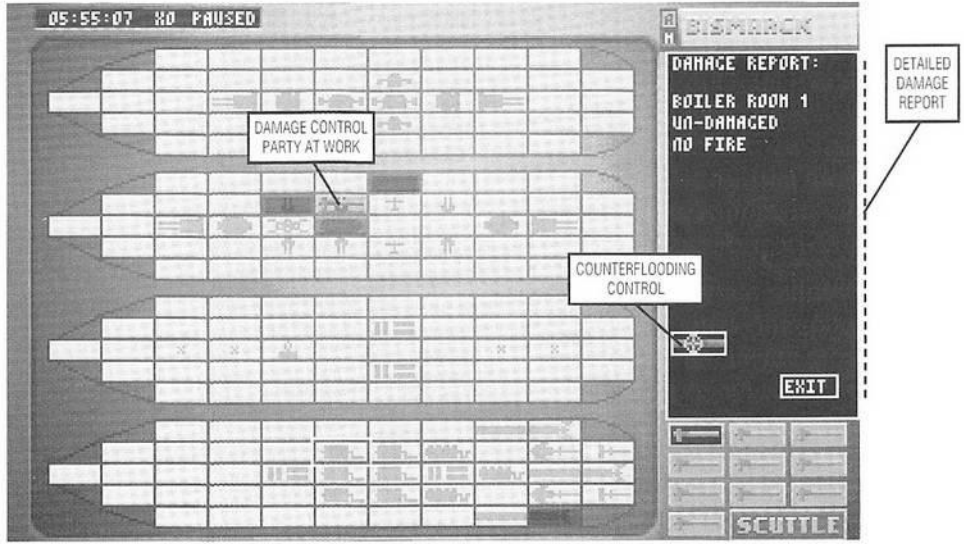
• *Compartments*
Each deck level is subdivided into 47 individual compartments. Some of the compartments contain icons representing a major system of the ship; empty compartments represent areas with other items: living quarters, storage, miscellaneous machinery space, etc. If a compartment is hit and damaged, it changes color; if a damage control party is assigned to it, the damage control icon is superimposed.

• *Damage Colors*
The following background colors signify the associated damage:

Dark Gray: Destroyed (not repairable)
Light Gray: Damaged (repairable)
Red: Fire
Blue: Flooded

• *Damage Control Party at Work*
A compartment containing an active damage control party will be marked with a hammer icon.

• *Detailed Information*
To access detailed information about a compartment, simply click on it. The information is displayed in the upper right portion of the Station, in place of the List Gauges.



Detailed Damage Report

Damage Control Party Area
This area contains boxes representing the ship's Damage Control potential. All ships do not have the same number of Parties available; larger ships generally have a larger number. Furthermore, as a ship is hit, the number of Parties decreases.

• *Damage Control Party Boxes*
Each box in this area containing a hammer represents one damage control party. If the background is colored, the party is currently unassigned; if it is black, the party is at work somewhere on the ship.

• *Assigning and Removing Damage Control Parties*
To assign a Damage Control Party to a damaged compartment, click on the compartment and then click on a party in the Damage Control Party Area. The background in the Damage Control Party Area changes from colored to black, and the appropriate icon appears in the desired compartment.

To remove a Damage Control Party from a compartment, click on the compartment to open the detailed report, then click on the Damage Control Party Icon in the report box. The Damage Control Party icon disappears from the compartment, and the background of the box in the Damage Control Party area becomes colored.

• *Scuttle Button*
At the bottom of the Damage Control Party Area is a button which enables you to scuttle (voluntarily sink) the ship. It is generally ill-advised to push this unless the ship is crippled and in imminent danger of being captured.

Effects of Damage

• *General Effects*

Unless noted below the following effects apply to all ships' equipment:

Damage: Damage to ship's equipment is usually repairable; however, the time taken may be outside the length of a single engagement.

Destruction: Destruction of ship's equipment means that the equipment cannot be repaired at sea and that that equipment will not be available until the ship has returned to port and been repaired.

• *Damage to Specific Equipment*

Bridge: The bridge is the primary control center of the ship. If it is lost, the ship goes out of control (no change of course or speed) until control of the ship is regained from some other position, and reaction times will be slower thereafter.

Alternate Bridge: Most large ships maintained a secondary control location away from the main Bridge location. If this is undamaged the reduction of control caused by the loss of the bridge is reduced substantially. If the Alternate Bridge is controlling the ship and is lost, the loss of control penalty will be applied.

Conn: The ship's steering is controlled from this location. If damaged or destroyed, ship's steering becomes random until control can be regained.

Main Turrets: The main armament of the ship is mounted in huge armored boxes with up to 15 inches of armor protecting the weapons and crew. They can be damaged or destroyed, however, which results in a substantial reduction of the ship's firepower.

Barbettes: When a turret is mounted high on the deck, the connection to the deck is called a barbette. Usually as armored as the turret itself, the barbette provides a link to the magazines. Loss of the barbette stops the turret from firing.

Secondary Turrets: Secondary turrets are the ship's armament for attacking smaller targets. These were often open to the elements and had very little armor. Mounted on the extremes of the ship rather than on the centerline, these turrets were unusable in rough seas or when the ship listed strongly. Loss of each turret reduces the firepower of the battery on that side of the ship.

Hoists: The hoists carry shells from the magazines to the turrets. If lost, the associated turrets will not be able to fire.

Torpedo Mounts: Torpedo mounts were mounted in exposed positions on the ship's deck and were therefore unusable during rough weather. If they are destroyed, torpedoes cannot be fired from that side of the ship.

Aircraft: Aircraft carried by battleships and cruisers were used to search for enemy ships and to spot the fall of shot during gunnery. On deck, a fragile WWII aircraft was very dangerous; if hit, it would usually explode and spread flames over the deck.

Directors: The ship's directors are used to direct the ship's guns. Mounted high on the ship's superstructure, they combined the data from rangefinders and fall of shot reports to calculate the firing data for the ship's guns. The directors allowed all the ship's guns to be concentrated on a single target without the mutual interference caused by local control. If one director is lost, the ship can still fire a broadside, but the guns associated with that director (fore or aft) can only fire under local control if firing by themselves. If both directors are lost, all turrets revert to local control. Local control is far less accurate than directed fire.

Funnels: The ship's funnels create the downdraft required for the combustion within the engines and direct away the exhaust gasses. If damaged or destroyed, the ship's maximum speed is reduced in proportion to the number of funnels on the ship.

Magazines: The shells for the ship's guns are stored in the ship's magazines. These are usually heavily armored and buried deep within the depths of the ship. The ship may blow up and sink if a shell explodes inside a ship's magazines or if a fire spreads to the magazines.

Radio Room: This is the communications hub of the ship. Loss of this facility removes any benefits of spotter planes for gunnery or spotting purposes.

Engine Room: The ship's engines provide the motive power for the ship. The ship's speed depends upon how many engine rooms are available. Non-diesel powered ships require a functioning boiler room. The speed reduction for loss of engine rooms is small at first because a great deal of extra power is needed to gain the last few knots of speed while cruising speeds can be achieved with as little as one third of the engines.

Boiler Room: On non-diesel powered ships, the boiler rooms provide the steam required to power the turbines in the engine rooms. The number of operational engine rooms is limited to the number of operational boiler rooms. Loss of a boiler room is equivalent to loss of the associated engine.

Steering Gear: These are the internal mechanisms required to change the ship's course. Loss of the Steering Gear has the same effect as Conn damage but is much more difficult to fix (just ask the crew of the Bismarck).

Shaft: The motive power provided by the engines is transmitted by the shafts to the propellers. Loss of a shaft reduces the maximum speed of the ship in the same way as engine room damage.

Propeller: The motive power provided by the engines is transmitted by the shafts to the propellers. Loss of a propeller reduces the maximum speed of the ship in the same way as engine room damage.

Rudder: The steering is controlled by the rudder(s). Loss of the rudder(s) increases the ship's turn radius significantly because of the inefficiencies of steering by changing the speed of the propellers.

Outside Station

This station gives a full outside view of the ocean from the observation tower of the current ship. You can use the View Left and Right Arrows to change the direction of the view and the Increase and Decrease Arrows to change the magnification level. This station also includes information such as current visibility and weather conditions. For more information about this station, consult the User's Guide.

Status Report

This report gives a summary of current information about the active ship, including the impact of damage, ammunition depletion, and fuel consumption. It also displays an overhead view of the ship, as described in "The Overhead View" on page 116.

Note that the game automatically pauses while you check this report, and automatically resumes when you finish with it. The only control on this report is the button that returns you to command of the ship.

Tactical Tips

The following section consists of tactical tips for Great Naval Battles: North Atlantic 1939-43. "General" tips are useful for both navies, and the tips labeled "German" and "British" are most useful to the appropriate side.

General

The most basic principle of dreadnought warfare is that a ship firing broadside has a tremendous advantage over one firing with just its bow or stern turrets. The reason is simple mathematics; a battleship's broadside shoots eight to twelve shells per salvo, while the bow turrets hurl six at most and the stern turrets generally even fewer.

During the First World War, large fleets of dozens of dreadnoughts sailed in line-ahead formation. "Capping the 'T'", or sailing one's own line across the front of the enemy line, was the ultimate dream of every admiral. By World War II, though, the range of gunfire had increased so much that sailing line-ahead was an administrative convenience rather than a tactical necessity. It should never be necessary to sail head-on toward the enemy; even if that is the general direction you want to go, your ships can jog to the left or right before firing in order to bring all their guns to bear. The main question relating to battleship gunnery was the choice between concentrating all available weapons on one target to eliminate it as soon as possible, or splitting fire among targets to degrade each as much as possible.

Furthermore, the growth of submarines and aircraft as threats to the big ships means that they should travel flanked or even encircled by lighter ships — cruisers and destroyers — whenever these are available. They can be used to screen against the new threats, and also to launch attacks of their own. Their guns won't make much of an impression on the enemy, although cruiser fire can make a nuisance of itself by starting fires and destroying superstructure on a battleship. Their torpedoes, however, make them a threat to be reckoned with.

Torpedoes are the great equalizers in dreadnought warfare; a lowly destroyer is as lethal an adversary as a mighty battleship. The standard response to a torpedo attack is to turn either into or away from the attack, since this reduces the target's profile, and hence the probability of a hit. An attack by a single destroyer can thus cause a heavier enemy ship to turn away, forcing it to break off an attack on a weaker force, and setting it up for a broadside from a major ship behind the destroyer. A coordinated attack by two destroyers can put a capital ship in a deadly crossfire. And a coordinated attack by destroyers and cruisers or battleships can impale the enemy on the horns of a most vicious dilemma.

Shipborn aircraft add an additional element to the situation. Most large ships carry float planes, which should be used to scout if the enemy is not visible. Aircraft carriers, which only the British have, carry strike aircraft, and these are a most potent threat. The aircraft can literally attack from a dozen directions at once, and one hit can doom the mightiest dreadnought. However, the carriers themselves are quite vulnerable to surface fire if the enemy is nearby, and so require special handling. In a surface exchange, carriers can be anything from a mild inconvenience to a crippling liability. The best solution is to do everything possible to keep them well away from enemy surface ships.

Finally, whichever side you play, remember that battleships are surprisingly fragile. Despite their massive armor and armament, just a few hits will begin to cause significant damage, and after a few more hits damage starts to become critical. Even if the ship is not sunk, it may be put out of action for so long it might as well have been. The key to victory is the careful coordination of all your various types, using them to help maximize each other's powers while compensating for each other's vulnerabilities. If you rush your heavy ships into battle with no better plan than just to slug it out, even a victory may, as the Bismarck found after sinking the Hood, prove Pyrrhic.

German

In most scenarios, you will have fewer but better ships. Try to determine in what ways specifically your ships are superior to the British, and take advantage of those superiorities. For example, if your ships outrange the enemy, try to keep the battle at long range; if your ships are faster than the British, try to hit and run. In general, these technical considerations recommend keeping your distance, where your technological advantages can do you the most good. Furthermore, these tactics are also consonant with your overall mission in most cases, which is generally not to sink warships, but to disrupt Allied shipping. Like a fleet in being, a healthy German ship lurking near the sea lanes is more of a threat to the British than a victorious cripple, no matter how spectacularly it has acquitted itself against one or two enemy warships.

British

In most scenarios, you will have a greater number of, but less capable, ships than the Germans. Consequently, your best bet is usually to close with the enemy as quickly as possible, setting up a melee at close quarters in which differences in armor, gun ranges, accuracy, and ship speeds count for less. This type of fight is likely to be costly for both sides, but since your navy is greatly superior overall, it can afford an even or slightly disadvantageous exchange, while the Germans can't.

One very significant exception to this advice concerns aircraft carriers. You have them and the Germans don't, which gives you a tremendous advantage. But if you expose them to a surface engagement, you soon won't have them either. So guard them carefully and, better still, keep them well away from all enemy ships.

COMMANDING THE FLEET

The Admiralty

The Admiralty is the command headquarters for your country's surface fleet, either the Royal Navy or the Kriegsmarine. Here you direct the operations of battleships, carriers, cruisers, and destroyers across the vast North Atlantic. Make the strategic and operational decisions that set the stage for the decisive engagements. In essence, make the decisions that win or lose the war.

The Strategic Map

The Strategic Map shows the critical area of the North Atlantic Ocean, Britain's vital lifeline to its empire and America. Displayed on it are the resources you and your enemy bring to the struggle: the bases which harbor your ships, the task forces in which they are organized, the stations they patrol, and the aircraft which support them. Also displayed are the objects of the struggle: the convoys that sail back and forth between England and the world. As the British, it is your job to protect them; as the German it is your job to bring them to a halt.

Map Environment Information

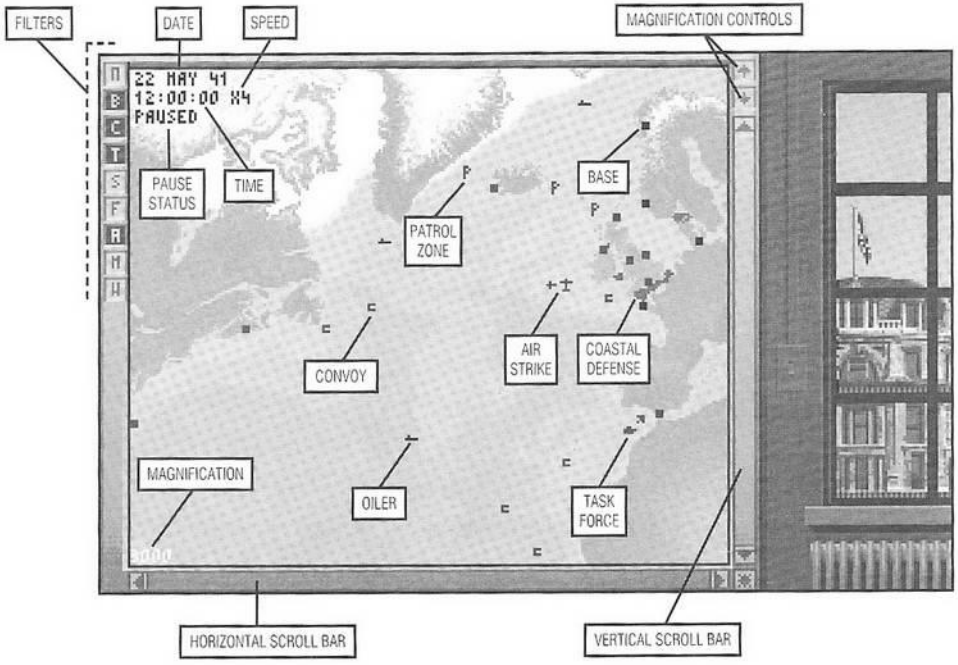
The following describes map environment information.

Date
This tells the month, day, and year of the current game.

Time
The time of day. The events on the strategic map are updated on an hourly basis.

Speed
The rapidity with which the strategic map is updated.

Paused
This appears if the pause option is selected. Note that you can still use all game controls while the game is paused, so it is a good idea to pause whenever you are considering a major initiative.



The Admiralty: Strategic Map

Magnification
The amount of space shown per inch on the screen. The higher the number, the larger the amount of water shown, but the less detail displayed. The highest level (3000) shows 3000 square miles, thus the entire North Atlantic; the lowest level (375) shows 375 square miles of ocean.

Map Environment Controls

The Map Environment Controls enable you to change the amount of detail and the kinds of details displayed.

Magnification Controls
The up arrow decreases the magnification of the map (shows a larger area in less detail), while the down arrow increases the magnification (shows a smaller area in greater detail).

Vertical Scroll Bar
Shifts area displayed on map up and down (North and South).

Horizontal Scroll Bar
Shifts area displayed on map left and right (West and East).

Centering
You can center the map on the mouse pointer rather than by using the scroll bars if you want. Simply press the left mouse button while holding down the "Ctrl" key on the keyboard.

Filters
Each control toggles the associated information displayed on the map. In general, you will usually want to have the second, third, and fourth of these on, displaying the others as needed.

"N" (Name): Displays each ship's name adjacent to its location.

"B" (Bases): Icons show the location of each side's bases.

"C" (Convoys): Icons show the location of convoys. Information available for the Germans is usually sparse.

"T" (Task Forces): Icons show the location of task forces whose position is known. Knowledge by both sides of enemy locations is generally very incomplete.

"S" (Search): Circles show the range of reconnaissance craft from each base. Range is usually set by reconnaissance planes based there, but should there be none, it reflects the range of the small patrol craft at the base.

"F" (Fuel): Shows the range remaining for each task force based on cruising speed.

"A" (Aircraft): Shows aircraft in the air on their way to or returning from executing an air strike.

"M" (Movement Plots): Shows the planned moves of friendly task forces.

"W" (Weather): Shows the weather forecast, explained in "The Environment" on page 191.

Combat Elements

The only true combat units in naval warfare are ships and planes, but at the strategic level these seldom operate individually. Instead, they work in groups that are associated with a common location or activity, and these are the elements that you command at the strategic level of Great Naval Battles: North Atlantic 1939-43.

To issue instructions anywhere but a coastal defense zone, click on the icon on the map; you are given access to the displays that control it. Coastal defense zones involve small craft and airplanes that are beyond your command, but they strike hard at any enemy attempting to enter.

Note that the game pauses while you issue orders to any of the combat elements.

Bases

These combine ports and airfields. Ships must return to them periodically to refuel, and get repaired and refitted. Aircraft operate from them, carrying out reconnaissance patrols and launching strikes against enemy ships and bases. To review or issue orders to a base, simply click on its icon.

Oilers

These are German supply ships that can replenish the fuel of ships in their task forces. They function like bases for this purpose (only). Each oiler can refuel one task force. British intelligence will occasionally spot an oiler on station. Should this happen, a task force can strike and eliminate that ship.

Task Forces

These are groups of warships operating together as a unit. Unlike land units, they are usually temporary groupings, formed for a specific purpose and dissolved upon its completion. To review or issue orders to a task force, simply click on its icon.

Patrol Zones
These are, as their names imply, simply areas in which you are likely to want to maintain a continual presence in order to detect any enemy movement through them. Specifically, they are the three "gaps" through which the Germans must move in order to enter the North Atlantic: the UK - Faroes gap, the Faroes - Iceland gap, and the Iceland - Greenland gap (the Denmark Strait). To review or issue orders to forces on patrol, simply click on the patrol zone icon.

Convoys
These are not true combat units, but they are the object of combat operations and can contain combat elements. The goal of most German activity is to locate, intercept, and destroy them; the aim of most British activity is to prevent that. While patrols and task forces are the first lines of defense, once the Germans are at large, the British will generally assign heavy ships directly to convoy escort duty to provide a final counter to a marauding German raider. To review or issue orders to a convoy, simply click on its icon.

Air Strikes
Air strikes represent the swiftly moving squadrons of aircraft streaking from their base or carrier to strike at enemy vessels that have moved within range. You can access information and controls for one by clicking on its icon; this shows its origin (base or task force), the type and number of aircraft, and their target. This display includes a RECALL button to abort the mission, and an EXIT button to return to play.

Coastal Defense Zones
These zones are located in the English Channel and the Skagerrak, the straits between Denmark and Norway. If German ships enter the English Channel, or British ships enter the Skaggerak, they will be subjected to heavy and sustained attacks by mines, light craft, and airplanes. It is possible to make it through undamaged (witness the famous "Channel Dash"), but it is unlikely.

Other Map Information

The following information may also be found on the map:

Searches

Most bases contain at least one type of reconnaissance aircraft. They patrol within the radius of their range, which is shown by the circles around bases when the "S" filter on the strategic map is on. Within this circle, the probability of detecting an enemy task force is determined by the number of reconnaissance aircraft available and the distance from the base (the greater the number of recon planes and the closer the ships are to the base, the greater the probability of detection). In cases where a base has no reconnaissance aircraft, patrols by small patrol craft will still provide some reconnaissance ability, but the probability of detection is vastly reduced.

Fuel

Shows the maximum distance each task force can travel at sea while sailing at cruise speed. For more information about task force speeds, see the "Task Forces" section on page 170.

Movement Plots

You can order each of your task forces to move along one or a series of courses, and these are shown by lines when the "M" filter is on. How to add, change, or revoke these orders is explained below, in the section on "Task Forces" on page 174.

Weather Forecast

When the "W" filter on the strategic map is on, a chart showing the Beaufort scale value and the visibility today and predictions for each of the next four days (with declining reliability) is shown for each of nine weather zones. For more information about the weather values, see "The Environment" section on page 191.

BASE ACTIVITIES

You issue orders to forces located at a base through the base display. The base display enables you to organize task forces, air strikes, and air patrols; to detach ships for and recall them from patrol and convoy escort duties; and to move them into and out of dry-dock, where they undergo refit and repair.

ACCESSING A BASE DISPLAY

To access the base display, simply click on the base icon on the strategic map.

AIR OPERATIONS

You can direct air operations from this base through the controls in the Air Operations Area. The base can contain up to three types of planes, two of which can be strike aircraft. Each type is listed on a separate line of readouts and controls on the Air Operations Area.

In general, to launch a strike, you shift planes of one of the types of strike aircraft from the "Ready" group to the "Mission" group, select a target, and press the launch button. By repeating this process, you can direct successive groups of strike aircraft at different targets (or at the same target if you wish), up to the limit of aircraft based at this base. Note that you do *not* have to manage reconnaissance aircraft in the same way; they are always used to help patrol within the search radius of the base.

Aircraft Type

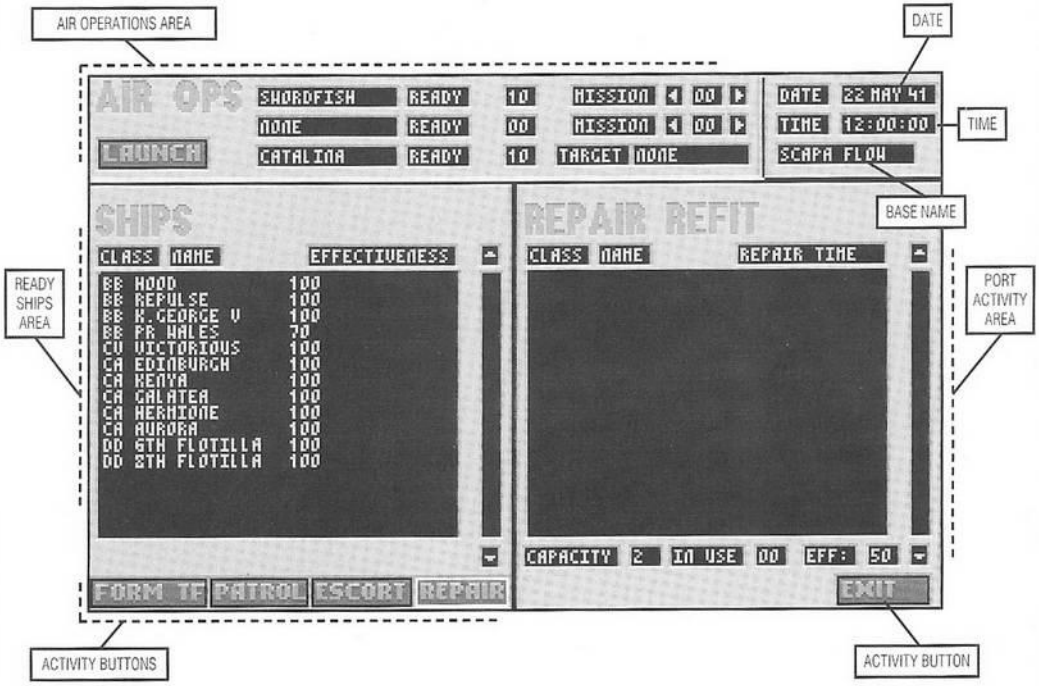
This readout gives the name of the type of aircraft. The computer will occasionally change types to replace older model aircraft with more modern models of the same basic type (strike or reconnaissance) as they become available.

Ready Aircraft
This readout displays the number of aircraft available at the base for a new mission. You cannot change this number directly, but you do affect it indirectly when you assign planes to a mission. Furthermore, the computer automatically adds to it when missions return to base (minus any combat losses) and as replacements and reinforcements periodically fly in.

Mission Aircraft
This control shows the number of aircraft of this type currently assigned to a mission. To increase the number assigned, click on the right arrow; to decrease it, click on the left arrow. Note that there are no "Mission" controls for reconnaissance aircraft since they automatically contribute to the base's control capability.

Target
This control shows the current target for the strike aircraft assigned to "Mission". To change targets, click on the "Target" readout, which brings out a map in the "Activity Area" below, point to the new target on the map, and click. Note that you do not need to set a target for reconnaissance aircraft.

Launch Button
Press this button to order strike aircraft to take off on the mission against the current target. Note that reconnaissance aircraft do not need to be launched, since they patrol continuously.



The Admiralty: Base Display

Ready Ships

The "Ready Ships Area" lists the ships at the base that are available, along with their class and effectiveness.

Ship Classes

- *BB:* Battleship (including Battlecruisers)
- *CA:* Cruiser
- *DD:* Destroyer
- *CV:* Aircraft Carrier

Ship Effectiveness

Ships in the Ready Area of the Base Display are classified into four degrees of effectiveness. The percentages are based on the decreased performance of the vessel due to extended use or combat.

- *Crippled:* 10% effectiveness
- *Impaired:* 10-30% effectiveness
- *Damaged:* 30-70% effectiveness
- *Normal:* 70+% effectiveness

Port Activities

While at a Base Display you can do one, some, or all of the four possible Port Activities. To select an activity, click on one of the Activity Buttons at the bottom of the Ready Ships Area. This brings up the appropriate Port Activity Display in the Port Activity Area. You then shift vessels between the Activity Area and the Ready Area by clicking on the ship name. It disappears from its current location and appears in the alternate list.

Form TF
This Activity Display enables you to create a new task force (TF) from ready ships. You can either accept the default name or type in a name yourself. Once you have given the TF a name, click on the ships in the Ready Ships Area you want to put in it, and their names move into the Task Force Display. If you change your mind, you can remove a ship from the TF by clicking on it in the Task Force Display, and it moves back to the Ready list. When you are satisfied with the composition of the new force, click on the ORDERS Activity Button. You may also click on the EXIT button to return to the Strategic Map, and abort the creation of the new TF.

Patrol
This Activity Display is only relevant to the British player, since only his side needs to guard the entrances to the North Atlantic against incursions by the enemy. It lists the ships currently assigned to patrol duty, and enables you to shift ships from the Base's Ready Ships area to the Patrol Ships pool or back. To shift a ship to or from patrol duty, click on its name and it moves to the other list. Note that this display does *not* enable you to assign the ship to one of the three specific patrol zones, but instead to the *pool* of ships available for those specific assignments. Furthermore, note that there is a delay of four or five days between the time that a ship is detached for patrol duty and the time when it is actually available for service. To affect the actual assignments to the patrol zones, you must use the Patrol Zone Display, described in "Patrol Zones and the Patrol Pool" on page 175.

Escort
This Activity Display is only relevant to the British player, since only this side runs convoys. It lists the ships currently assigned to convoy escort duty, and enables you to shift ships from the Base's Ready Ships area to the Convoy Escorts pool or back. To shift a ship to or from escort duty, click on its name and it moves to the other list.

Note that like the Patrol Ships Display, this activity assigns vessels to the *pool* of ships available for duty. Furthermore, note that there is a delay of four or five days between the time that a ship is detached for escort duty and the time when it is actually available for escort service.

Repair

This Activity Display lists the ships currently undergoing repairs or refits at this particular base, along with their class and the time remaining before work on them will be complete. At the bottom, it displays the total capacity of the base's repair facilities, the amount of that capacity that is currently in use, and the effectiveness of work being done. For further information, see "Repairs" on page 187.

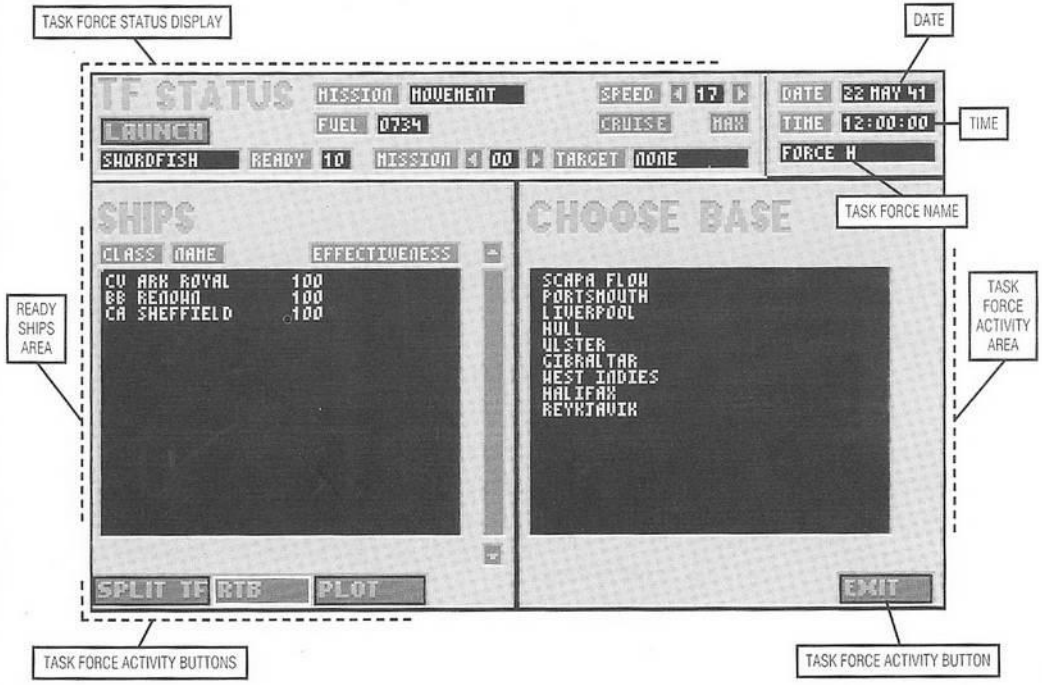
Base Report

The Base Report gives an overview of all Bases in the game. It displays information about each base's name, reconnaissance aircraft, ready aircraft, ready ships per class, repair capacity, repairs under way, and repair effectiveness. Information on aircraft and ships can be found in the preceeding section; information on repairs can be found in the "Repair" section on page 187. Note that you can go from this display to any base by "Ctrl"-clicking on its name with the left mouse button.

Task Forces

Task Forces

Task Forces are groups of warships operating together as a unit. They are usually temporary groupings, formed for a specific purpose and dissolved upon its completion. Nevertheless, during World War II some Task Forces maintained their identity for a long period, even though the specific ships assigned to them changed significantly.



The Admiralty: Task Force Display

Accessing a Task Force Display

To access the display for a task force, simply click on the task force icon on the Strategic Map, or select the name of the task force via the TASK FORCES item in the REPORTS pull-down menu on the menu bar.

Task Force Status

Speed Setting

This is the qualitative value of the ship's current speed, either "Cruise" or "Maximum." Cruise speed is one-half of maximum speed, and uses forty percent of the fuel. Maximum speed is the task force's top speed, and uses two and a half times as much fuel as cruise speed. For the specific value in knots, see the "Current Speed" readout.

Current Speed

The speed, in knots, at which the task force is currently moving. You can adjust this value by clicking on the arrows to either side of it.

Max. Speed

The fastest speed, in knots, that the task force can go. This speed is the maximum speed of the slowest vessel in the group.

Fuel Status

This readout gives the number of hours the task force can proceed at cruise speed, given the endurance of the ship with the least amount of fuel capacity.

Status
The task force's current orders. Possibilities are:

- *In Port*
The task force is in port and ready to go.

- *Shadow*
The task force is following an enemy force.

- *Refueling*
The task force is in the process of refilling its fuel tanks.

Speed Buttons
You can set the task force's speed to its cruise speed or its maximum speed by clicking on the appropriate button.

Launch
If the task force contains an aircraft carrier, this button appears in the Task Force Status area. Air Operations works much like the Air Operations display described above in "Bases" on page 165. You can use it to launch an air strike from the aircraft carrier in exactly the same way as from a base.

Ready Ships
This display lists the ships currently on station in the patrol zone, along with their class and effectiveness. For further information about class and effectiveness, see the "Ready Ships" section of "Bases" on page 168.

Task Force Activities

Split TF

This activity enables you to divide a single task force into two smaller ones by detaching some of its ships. The controls work like forming a new task force at a base, except that ships naturally switch between the existing task force and the new task force rather than the base and the TF. For further details using this display, see the "Form TF" section of "Bases" above, page 169.

Return to Base (RTB)

This activity enables you to force ships currently on station to return to the designated base. The Task Force immediately heads there by the shortest available route. The purpose of this activity is convenience; it saves you the trouble of plotting a course to the base's exact location.

Plot

This activity enables you to lay out the course for the task force. When you choose it, the display shifts to the Strategic Map (the filters and controls work normally, as described in "Strategic Map" on page 161).

• *How to Plot a Course*

To plot a course for the Task Force, simply click on the map, and that point becomes its next destination. You can set up one long straight route or click repeatedly at different points on the map to lay down a complex course with up to 10 waypoints.

• *Additional Plot Controls*

A readout to the right of the map keeps track of the number of way points you have set. Nearby is a CLEAR button that enables you to erase all your plots and start over if you change your mind. Press the DONE button when you are satisfied with your orders.

Task Force Report

The Task Force Report gives an overview of all Task Forces in the game. It displays information about each task force's name, speed (in knots), maximum speed, fuel, and destination. These are the same items of information that are given for each individual task force, under "Task Force Status" on page 172. They are assembled in this report to give you a quick overview.

Patrols

Patrol Zones and the Patrol Pool

There are three standard patrol zones: the Greenland - Iceland gap, the Iceland - Faeroes gap, and the North Sea (Norway - UK, and UK - Faeroes). As an administrative convenience, you can assign ships to help patrol these strategic straits using the Patrol Display rather than continually plotting and re-plotting the movements of ships as they move to their station, picket back and forth, and then return to base to refuel. Instead, ships you assign to patrol duty join a pool of vessels available for deployment, and the computer cycles them to and from their stations as their fuel needs dictate.

When you transfer ships from a base to patrol duty, you do not assign them to a specific patrol zone. Instead, they are assigned to a pool, which they take about four or five days to reach. The computer draws them from this pool as it needs ships to maintain the patrol in a zone at the level you have indicated (see Patrol Composition, below). The ship stays on station as long as it has sufficient fuel, and then cycles back into the pool, ready (after a period of transit, refueling, and possibly refitting) to relieve another vessel coming off station.

The effectiveness of these patrols is also handled abstractly. The more ships that are available in the pool, the more can be maintained on station at any one time. And the higher the number of ships on station, the greater the likelihood that they will spot a German Task Force moving through the zone. The likelihood is also strongly affected by the weather conditions, which are discussed in "The Environment" section under "Visibility" on page 194.

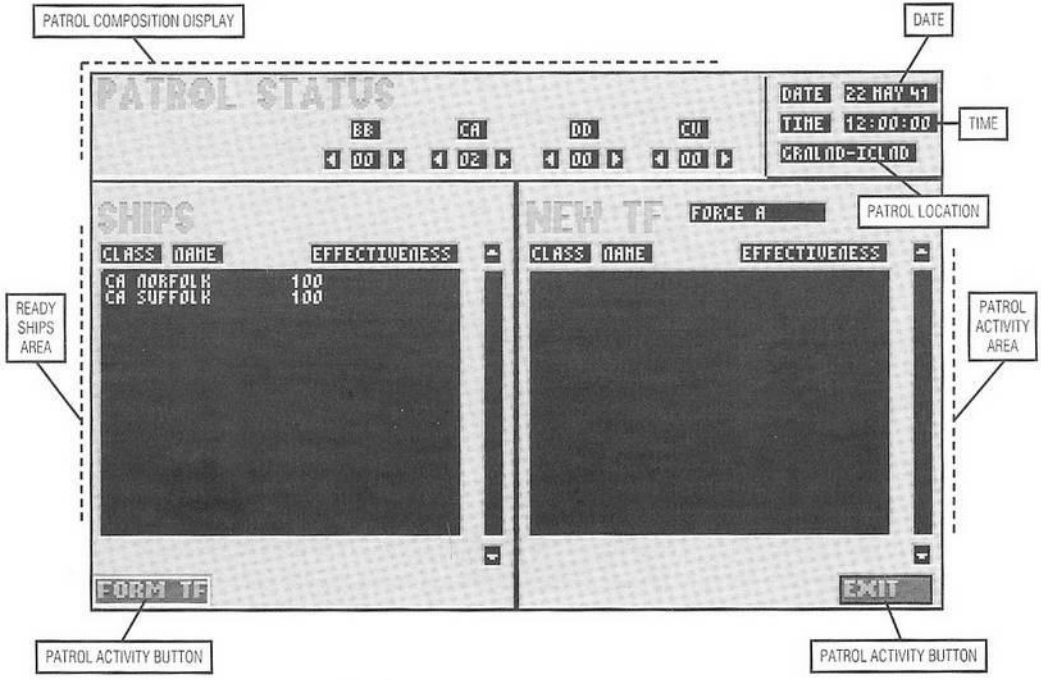
Accessing the Patrol Display

To access the Patrol Display for a Patrol Zone, simply click on the patrol icon on the Strategic Map.

Patrol Composition

This display enables you to set the number of cruisers, destroyers, battleships, and carriers you want to maintain on station in the patrol zone. Once you set this number, the computer attempts to draw the appropriate ships from the patrol pool, balancing the numbers here with the numbers you have requested for the other two patrol zones. The abbreviations for the types of ship are given in the "Ready Ships" section of "Bases" on page 168.

It takes three ships of a particular type to maintain one on station at all times in a patrol zone, although after Iceland becomes a base you may get by with two. The reason is that a ship can only remain on station for a few days, after which it must return to base for fuel and repairs, so that at the same time that one ship is on station, one is probably in transit, and another is in port. Keep this ratio in mind as you assign ships from bases to the patrol pool and when you set the levels you desire in each of the three patrol zones. For example, to make sure there is always at least one cruiser in each of the three zones, you will need to assign *nine* cruisers to the patrol pool, and set the Patrol Composition levels to 1 CA on each display.



The Admiralty: Patrol Display

As a final note, destroyers have a low endurance that limits their usefulness on ocean patrols. Battleships and carriers, on the other hand, are rather valuable to use in this role, except in special circumstances. Cruisers were designed for this type of duty, and the British have plenty of them.

Ready Ships

This display lists the ships currently on station in the patrol zone, along with their class and effectiveness. For further information about class and effectiveness, see the "Ready Ships" section of "Bases" on page 168.

Patrol Activity: Form TF

This activity enables you to use some of the ships patrolling this zone to form a separate task force. Generally, you will want to do this when you are trying to corner a German raider and these vessels are in a good position to help, or when you want them to leave patrol duty for some other service. This activity works exactly like forming a new task force at a base, except that the ships naturally switch between the patrol and the new task force rather than the base and the TF. For further details using this display, see the "Form New TF" section of "Bases" on page 169.

Effects of Patrols

If ships in a patrol zone detect a German ship, they form a task force and attempt to intercept or shadow it. The decision whether to do one or the other will be based on the patrol commander's assessment of the relative strengths of the two forces. If the British have a reasonable chance of success they will attack; if they don't, they will shadow. More specifically, cruisers will generally attack a cruiser but not a battleship, while a battleship will almost always attack (they are generally slower than the Germans, and they win even if they only damage the raider, since it will be forced to abort the sortie).

Patrol Pool Display

In addition to the Patrol Display, you can access a display that shows all the ships assigned to patrol duty and gives information about their current status. The information includes each ship's class, name, and effectiveness, just as in the "Ready Ships" section of "Bases" on page 168. Furthermore, it gives the ship's status in the patrol system, its location, and, where appropriate, its estimated time of arrival. Status is conveyed by the following items:

Patrol
The ship is currently on station in the zone named under "Location".

Ready
The ship is available for assignment.

In Transit
The ship is in transit, either on its way to join the patrol pool, or on its way to or from its patrol station. Ships that are in transit are out of touch until they reach their destination, which will occur at the ETA.

Refueling
The ship is undergoing minor servicing after one patrol and in preparation for another at the base named under "Location", and will be available for service at the time given under ETA.

Note that you can access information about an individual ship shown on the Patrol Pool Display by clicking on its name. "Ctrl" plus the left mouse button brings up a Status Report, while "Alt" plus the left mouse button brings up a Ship Damage Report.

Patrol Report

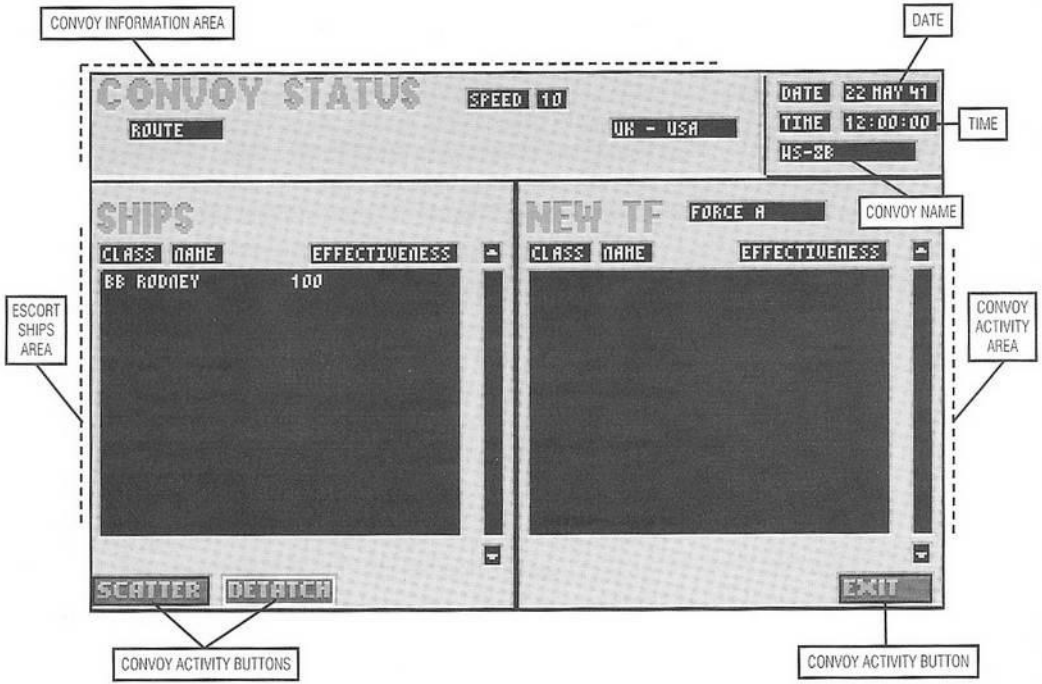
The Patrol Zone Report gives an overview of all three Patrol Zones in the game. It displays information about each zone's name, the desired number of ships on station by class, and the actual number of ships on station in each class. Note that you can go from this display to any of the three desired patrol zones by "Ctrl"-clicking on its name with the left mouse button.

Convoy Escorts

Convoys

Convoys are groups of merchantmen, usually escorted by warships. While most of the convoy escorts were small ships that could have little impact on naval battles in the North Atlantic, the convoys themselves were the object of oceanic operations, and larger ships — cruisers and battleships — did escort convoys when German surface raiders were at large.

Naturally, only the British player is concerned with convoy operations. As the British, you can add and subtract major warships from the pool available for convoy duty via the Base Displays. You can also issue orders to convoys themselves through the Convoy Escort Display. The latter display enables you to order a convoy to scatter if attack by a German surface raider seems imminent (remember, though, this makes the merchantmen much more vulnerable to U-boats and aircraft), and you can detach some of the convoy's escort to help hunt for a raider if you feel they would be better used in the hunting party than shepherding the flock.



The Admiralty: Convoy Escort Display

Accessing the Convoy Escort Display

To access the Convoy Escort Display, simply click on the convoy icon on the strategic map, or select the name of the convoy from the CONVOYS item on the REPORTS menu on the pull-down menu bar.

The Convoy Escort Pool

When you transfer a ship from a base to escort duty, you do not assign it to a specific convoy. Instead, it is assigned to a pool, which it takes about four or five days to reach. The computer draws it from this pool the next time a convoy needing its support is about to sail. When the convoy reaches its destination, it is released back into a pool, ready (after a period of refit) to join a convoy going the other way.

As the previous paragraph implies, there are actually two parts of the escort pool, one on each side of the Atlantic. Furthermore, an escort is not immediately ready for service once it arrives, and it may have to move from its arrival port to the convoy's departure port as well. Consequently, the proper escort may not be positioned for a given convoy when it is ready to sail, even if there are sufficient warships assigned to convoy duty overall.

Ordinary convoys generally sail with whatever escort is available, or none at all, in order to stay on schedule. Important convoys, like troop convoys, though, will delay their departure until appropriate escorts are assembled. Usually, the delay will only be for a day or two, but it can take a week to ten days if the only available battleship has just joined the escort pool and must sail across the ocean to join the convoy. Each day of delay costs the British victory points, so keeping a more than adequate escort pool is generally desirable.

Convoy Information

This portion of the Convoy Escort Display shows information about the convoy to help you integrate it into your strategic plans.

Speed

Every convoy travels at a set speed so that the merchantmen could stay together. There are three standard speeds for convoys: slow (7-9 knots), fast (10-15 knots), and special (generally ocean liners carrying troops travelling 15-25 knots). This display shows the exact speed in knots of the convoy.

Route

Each convoy crossing the ocean is moving from an origin to a destination. Some of the merchantmen will unload at the destination port itself, but many or most will join the coastal traffic to other ports.

ETA

This is the "Estimated Time of Arrival," or the date on which the convoy is expected to reach its destination.

Escort Report

This display lists the major warships escorting the convoy, along with their class and effectiveness. For further information about class and effectiveness, see the "Ready Ships" section of "Bases" on page 168.

Convoy Activities

While at a Convoy Escort Display you can do one or both of the two possible Convoy Activities. To select one, click on the Activity Button at the bottom of the Escort Ships Area. If you select the SCATTER button, the convoy simply ceases to exist. If you select the DETACH button, it brings up the Form TF Display in the Convoy Activity Area. You can then shift vessels from the Escort Ships Area into a new task force.

Scatter

If you press this button, the merchantmen in the convoy begin sailing on divergent courses, making for their destination separately. The purpose of this order is to avoid giving a nearby German surface raider a concentration of merchant shipping to ravage. The drawback is that it gives German U-boats and aircraft many undefended targets. It is a desperate move, but there are times when it is the best course of action. Any major warships with the convoy automatically form a separate task force.

Detach

This activity enables you to use some of the major warships escorting this convoy to form a separate task force. Generally, you will want to do this when you are trying to corner a German raider, and these vessels are in a good position to help. This activity works exactly like forming a new task force at a base, except that ships naturally switch between the convoy escort and the new task force rather than the base and the TF. For further details regarding this display, see the "Form TF" section of "Bases" on page 169.

Convoy Pool Display

In addition to the Convoy Escort Display, you can access a display that shows all the warships assigned to Convoy Escort duty and gives information about their current status. The information includes each ship's class, name, and effectiveness, as described in the "Ready Ships" section of "Bases" on page 168. It also includes its status in the convoy system, location, and ETA. The status is conveyed by the following items:

Escort
The ship is currently escorting the convoy named under "Location", and will remain committed to this task until the time given under "ETA", unless detached.

Ready
The ship is available for assignment to a new convoy.

In Transit
The ship is in transit, either on its way to join the convoy pool, or on its way to or from an assignment. Ships that are in transit are out of touch until they reach their destination, which is given under "Location". They will arrive at the time given under "ETA".

Refueling
The ship is undergoing minor servicing after one assignment and in preparation for another at the base named under "Location", and will be available for service at the time given under "ETA".

Note that you can access information about an individual ship shown on the Convoy Pool Display by clicking on its name. "Ctrl" plus the left mouse button brings up its Status Report; "Alt" plus the left mouse button brings up its Damage Report.

Convoy Report

The Convoy Report gives an overview of all convoys in the game, both past and present. The reason for listing the present convoys is to help you keep track of which convoys are where. The purpose of maintaining a record of past convoys is to show the balance in the shipping war, which is the main criterion for victory.

The Convoy Report displays information about each convoy's name, speed (in knots), route (origin and destination), the number of merchantmen in it, its status, and the victory points associated with it. The status is conveyed by one of the items below; the victory points equal the number of points awarded, if the convoy has already arrived, or the number of points it is worth, if it is still under way. The Convoy Report also displays the total victory point balance awarded for convoy actions to the right of the title.

Under Way
The convoy has left its point of origin and is proceeding to its destination.

Scattered
The convoy has split up, with each ship trying to make it to the destination on its own.

Delayed
The convoy is in port waiting until some danger is past before proceeding. Each convoy delayed costs the British victory points, and the longer the delay, the greater the loss.

Completed
The convoy has reached its destination and dispersed.

Repairs

Any ship that puts to sea suffers from wear and tear, and needs periodic maintenance. Furthermore, warships suffer from battle damage, which sometimes can be patched up at sea, but always needs final attention in port. Taking ships off of active duty for repairs can seem like a dangerous diversion of precious resources, but *not* keeping your fleet in good repair is far more dangerous in the long run.

Accessing Repair Facilities

Repairs are conducted at bases. To get a ship into repair, you must move it to the base you want to do the repairs, and then move it from the Ready Area to the Repair Area. For more information on base activities, see "Bases" on page 165.

Capacity

The repair capacity of a base equals the number of ships that it can repair at one time. This number reflects not only the facilities at the base's harbor itself, but also the facilities at other ports in the same general area. Scapa Flow, for example, had no repair facilities at all in actuality, but in the game it has a repair capacity that represents that of all the ports of northeastern Britain. If you have more ships in for repair than the base's capacity, it will repair all of the ships, but at a greatly reduced effectiveness.

Costs and Priority

Each ship under repair requires one repair slot, and remains under repair until fixed. While a battleship is given priority over a light cruiser for a newly available slot, it cannot displace one already in the shipyard. Hence, you may want to delay sending a minor ship for repairs if you anticipate needing the facilities for a major ship in the near future.

Effectiveness

This value represents the effects of bombing on the speed with which bases can complete repairs. American ports were not subjected to bombing, and therefore will always operate at maximum effectiveness, but both British and German ports suffered repeated disruptions. In general, the British will operate at reduced effectiveness early in the game and then gradually rise, while the Germans will start at high effectiveness and gradually lose it, reflecting the progress of the air war. However, any particular port's rating will fluctuate considerably, reflecting the effects of specific air raids on the locality.

Automatic Repair Activity

Crippled ships automatically move into repair, while ships completely fixed automatically move out. Within the pool of ships awaiting repairs, new ships will automatically be picked to move into vacated repair slots, with larger ships being given priority over smaller ones. You cannot influence this decision directly, but you can affect it by moving ships between the Ready list and the Repair list.

The All Ships Display

In addition to the Strategic Map, control displays, and pool displays described above, you can use the REPORTS pull-down menu on the menu bar to access a display that shows all your ships and gives information about them.

Ship Information

Class
The type of ship. The different classes are given in the "Ready Ships" section of "Bases" on page 168.

Name
This is the name of the ship.

Effectiveness
This is the ship's effectiveness, as defined in the "Ready Ships" section of "Bases" on page 168.

Fuel
This is the number of days the ship can travel at cruise speed. For more information, see "Task Force Status" on page 172.

Status
This is what the ship is currently doing. Different possibilities are given under "Ship Status".

Location
The place where the ship is doing what it's currently doing.

Time
The estimated time at which the ship will be finished with whatever it is doing (shown only when the ship is with a convoy, undergoing repairs, or in transit).

Ship Status and Location

Task Force
The ship is currently serving with the task force named under "Location".

Patrol
The ship is currently assigned to patrol duty in the patrol zone named under "Location".

Escort
The ship is currently assigned to escort duty with the convoy named under "Location".

In Port
The ship is currently at the base named under "Location".

Distant Service
The ship is assigned to one of the distant theaters of the war named under "Location": the "South Atlantic", the "Mediterranean", or the "Far East".

Individual Ship Information

You can access information about an individual ship shown on the All Ships Display by clicking on its name. "Ctrl" plus the left mouse button brings up its Status Report; "Alt" plus the left mouse button brings up its Damage Report.

Even the steel-clad steamships and metal airplanes of the twentieth century are very much at the mercy of the weather, and the primal distinction between day and night has a profound impact on naval operations. The weather affects ships' combat capabilities and their ability to carry out patrols and searches. When the "W" filter on the strategic map is on, a chart showing the Beaufort scale value and the visibility for today and each of the next four days (with decreasing reliability) is shown for each of the nine weather zones into which the North Atlantic is divided. Furthermore, you should keep in mind the importance of the amount of daylight and nighttime, especially in the northern areas, where it can vary enormously according to the season.

WEATHER ZONES

GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 accurately simulates the weather patterns in the different parts of the North Atlantic Ocean.

The Arctic Region

The northernmost three of the nine areas are characterized by long stretches of moderate weather punctuated by infrequent but very violent storms, which interestingly tend to come up from the south. Visibility is generally restricted, particularly in the winter, when the days are very short. During the summer, however, the long hours of daylight mean that in clear weather visibility is enhanced greatly.

The Middle Region

The middle three areas are characterized by the weather conditions that give the North Atlantic a bad name; they tend to be stormy, overcast, and buffeted by dangerously high seas. Strong gales and Force 10 storms rage frequently, grounding aircraft and rendering all but battleship main guns ineffective. The difference between summer and winter in terms of hours of daylight is not as marked as in the Arctic region, but is stronger than most Americans experience.

The Southern Region

The three southern areas are characterized by much nicer weather than the ones to the north. Storms do happen, especially during late summer hurricane season in the southwest, but otherwise they are not frequent, and visibility is usually quite good. At these low latitudes, the differences between winter and summer daylight are also far less dramatic.

The Beaufort Scale

The prevailing weather conditions are usually described in terms of the Beaufort scale, a numbering system rising in terms of severity from 0 (calm flat seas with little or no breeze) to 12 (hurricane force winds accompanied by 30 foot plus waves). In Great Naval Battles: North Atlantic 1939-43 you will not see any Beaufort scale greater than 10 because in these conditions combat is impossible; all effort is being devoted to keeping the ships from capsizing. The game effects of the various Beaufort scale numbers are described in the table at right:

Beaufort Number	Wind Speed	Description	Game Effect
0	0-0.9 knots	Calm	None
1	1-3 knots	Light air	None
2	4-6 knots	Light breeze	None
3	7-10 knots	Gentle breeze	None
4	11-16 knots	Moderate breeze	None
5	17-21 knots	Fresh breeze	None
6	22-27 knots	Strong breeze	Sec. guns reload x1.5 DD gunnery penalty
7	28-33 knots	Moderate gale	Main guns reload x1.5 Sec. guns reload x2 CA gunnery penalty
8	34-40 knots	Fresh gale	Main guns reload x2 BB gunnery penalty Sec. guns cannot fire
9	41-47 knots	Strong gale	Main guns reload x2.5 No aircraft operations No torpedo firing No smoke
10	48-55 knots	Storm	Main guns reload x3 No aircraft operations No torpedo firing No smoke

Unless specified, all previous effects from a lower Beaufort scale apply to higher scales.

Visibility

Maximum Spotting Ranges

In order to have combat you must be able to see the enemy ships; unlike land warfare there is no terrain to impede your line-of-sight in naval combat. The curvature of the earth and the size of the ships limit the distance at which ships can spot each other. The basic spotting distances are listed below:

	BB/CV	*CA*	*DD*
BB/CV	40,000 yds	38,000 yds	34,200 yds
CA	38,000 yds	36,000 yds	31,400 yds
DD	34,200 yds	31,400 yds	21,200 yds

Battleships can see further because their superstructures are taller and thus allow sighting further over the horizon than cruisers and destroyers. Conversely, this same superstructure can also be spotted by enemy ships at longer ranges.

Weather and Visibility

Visibility is affected by both cloud conditions and, at the higher Beaufort levels, the surface conditions on the sea. The average distance of visibility in each weather area is shown on the Strategic Map as a range in yards (the ranges are the distances at which one battleship can spot another).

Land

Waters close to land are likely to be subject to local fogs not present farther out at sea.

Patrols

Visibility is of prime importance to patrols, because the lower the visibility, the less distance each ship or aircraft can cover, and the greater the possibility that a raider can slip by without being spotted. The only solution to this problem is to assign more ships to patrol when visibility is low. The optimum number of ships on patrol is the number needed to provide continuous coverage with small gaps that can be covered as the ships move back and forth. For example, two cruisers can pretty well cover a hundred square mile area if visibility is unlimited (about 20 miles or 38,000 yards in either direction). Each can see 40 miles at once, so 80 of the 100 miles are always under direct observation. The extra 20 miles are covered because if the patrol ships' movements are timed correctly, an enemy warship cannot move between them fast enough to avoid being seen.

Aircraft Operations

Note that aircraft cannot take off if the Beufort scale reading is seven or greater.

Seasonal Visibility

During the late spring and early fall, the weather conditions in the North Atlantic are often characterized by calm seas and thick fog — perfect conditions for a surreptitious sortie by a German raider! If you are playing as the Germans, take note. If you are playing as the British, beware!

Night and Day

Although radar was used in the North Atlantic during this time period, most battles were fought with visually sighted weapons (since radar can be detected farther than it can reliably "see," both navies were very wary about using it). The operational areas of the North Atlantic stretch into areas where, at different times of the year, there is nearly continuous twilight. Twilight conditions also apply during sunrise/sunset. The game system accurately reflects the time of sunrise/sunset and twilight anywhere in the North Atlantic.

While the difference between night and day has its most marked impact during engagements, it does have an important, yet subtle, impact on strategic operations. Specifically, visibility at night is far more limited than during the day regardless of cloud and sea conditions. Thus, even in extremely good weather, unless radar is available, spotting is an iffy proposition, since two ships may pass quite closely in the night without seeing each other.

Contact and Battle

When your forces come into contact with an enemy, you will be notified via a report. If the enemy Task Force is faster (and/or has good luck), it will have the initiative, so you will just be informed if it has avoided your ships, started shadowing them, or initiated a battle (in which case the game will proceed to an engagement). If, on the other hand, your task force is faster (and/or you have good luck), you will have the initiative, and can choose what will happen next. You will be presented with a display that looks similar to the Task Force Display, except that it lists your task force's ships on the left and the enemy's (more or less, depending on how good your intelligence is) on the right. You will be able to select whether your task force should avoid the enemy, shadow him, or move in to attack.

Events

Different kinds of events will play a critical role in the campaign and operations scenarios. Some events will be mundane developments — the return of a damaged ship to service or the appearance of a new model reconnaissance aircraft — but others will be dramatic, as when events in the Far East or Mediterranean require the detachment of ships from the British fleet, or the battleship Bismarck enters service. More information about the kind of events you can expect and their impact on play is given in the User's Guide.

SINK OR SWIM

VICTORY AND DEFEAT

Success or failure in GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-43 is measured by a combination of damage inflicted and sustained by warships and disruption to merchant shipping. Exactly how these are measured and balanced varies among the types of scenarios.

ENGAGEMENTS

Victory in engagements is determined simply by the relative amounts of damage inflicted and sustained by each side, with some modification to balance some scenarios. For more information, see the User's Guide.

OPERATIONS

Victory in operations is determined by the relative amounts of damage inflicted and sustained by each side, along with points awarded to the Germans for convoys sunk, scattered, or delayed. For more information, see the User's Guide.

THE CAMPAIGN

Victory in the campaign is determined by the impact of surface operations in the Atlantic on the timing of the D-Day invasion. Damage to ships and convoys intercepted or delayed are the primary influences on this critical event, but outside events, and the British ability to deploy ships to respond to them, play a role as well. For more information, see the User's Guide.

REPLAY MODE

For information about the Replay Mode, see the User's Guide.

IO Design Group, Inc. Credits

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Computer Graphics	Kim Biscoe
Design and Documentation	Ed Bever, Ph.D.

Strategic Simulations, Inc. Credits

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Associate Producer	Ken Humphries
Editors	Eileen Matsumi, André Vrignaud, and Al Brown
Playtesting	Michael Gilmartin, Thomas MacDevitt, Larry Webber, Jason Ray, Steven Okano, and Forrest Elam
Compatibility Testing	TSCS, Inc.
Music	Doug Brandon
Initial Development	David A. Lucca and Bret Berry
Graphic Design & DTP	Louis Saekow Design: David Boudreau, Kathryn Lee, Kirk Nichols and Chris Mischak
Printing	Banta ISG

Special Thanks...

For access to photographs and art: the staff of the Photographic Archive in the Naval Library at the Washington Navy Yard, Washington, D.C.

For additional testing: Joel Billings, Dan Cermak, Joyce Lotter, Graeme Bayless, and Curt Hopkins

For additional copyediting: Carole Johnson

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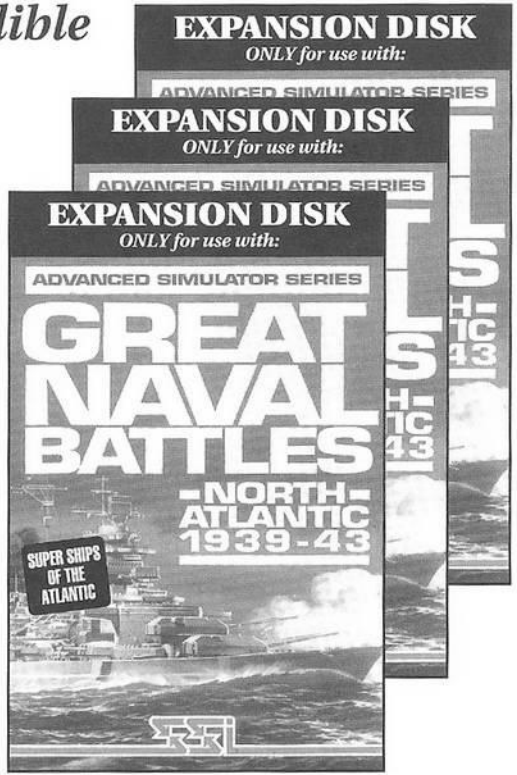

■ SUPER SHIPS OF THE ATLANTIC

SUPER SHIPS OF THE ATLANTIC includes German and British ships that were being built *but never finished in time* to see action in the war, as well as ships that were on the drawing table, *but never built!* Includes a set of scenarios plus a *"What if?"* campaign! *Available for IBM in December, 1992.*

■ SCENARIO BUILDER

Create your own naval battles with this easy-to-use scenario builder for *GREAT NAVAL BATTLES: NORTH ATLANTIC 1939-'43.* SCENARIO BUILDER also includes an all-new Captain's Campaign where you can advance from Destroyer Captain all the way to Task Force Commander! *Available for IBM in January, 1993.*

■ AMERICA IN THE ATLANTIC

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